FINANCIAL INTERMEDIATION AND POVERTY NEXUS: EVIDENCE FROM SELECTED DEVELOPING COUNTRIES

by

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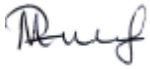
I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

SIGNATURE  DATE: 12 July 2019

ABSTRACT

The study examined the relationship between financial intermediation and poverty in selected developing countries. In particular the study sought to examine the deterministic relationship, cointegration and the causality between financial intermediation and poverty. Panel data spanning the period 2004-2016 for 35 developing countries was employed. Substantial empirical research proposed that financial development expands economic prospects and reduces poverty and inequality. Hitherto, there is a dearth of empirical studies on the potential effects of formal financial dimensions of financial access, financial efficiency and financial stability in reducing poverty. There is also a lack of empirical work on the joint effect of the other financial dimensions in a financial intermediation setting in poverty reduction. The present study contributed to literature by including these financial dimensions in examining cointegration and causality between financial dimensions and poverty. The study employed a number of econometric methodologies to address the objectives of the research such as the GMM, panel ARDL and panel ECM. The GMM was employed to examine the determinants of poverty that were selected for this study. To examine the long run, short run and the causal relationship, the panel ARDL and the error correction model were used. In addition the study deployed PCA to develop the composite index for institutional quality. Panel heterogenous estimation methods such as the pooled mean group to infer the cointegration and causal effect between the financial dimensions and poverty were employed. The Hausman test was used to determine the most appropriate estimator and the PMG estimator was selected as the most appropriate since the p-value of the Hausman test was insignificant. The results from panel ARDL, cointegration test showed the existence of a long run relationship between financial intermediation, financial access, financial efficiency, financial access and poverty. Furthermore, the study noted that the relationship between financial intermediation and poverty differ depending on how poverty is measured. Therefore, the distortions in understanding and definition of poverty may consequently lead to distorted policies that yield little or no results for the effectiveness of the financial sector in poverty reduction.The study found strong causality in the long run for all the poverty proxies and the selected financial variables. Additionally the results from the panel causality tests indicate the bidirectional causality of the variables in the long run. We fail to observe the causality among most

of the variables in the short run. There is strong joint causality among the variables in the panel as the results of the error correction term is negative and significant indicating that there is dynamic stability between the financial variables and poverty. The study further included the domestic public debt and remittances as determinants of poverty in a financial intermediation setting. Since domestic public debt can crowd out private credit, this study included domestic public debt for the panel of the developing countries and the study found that domestic public debt has a poverty reducing effect. Additionally the study found that remittances reduce the share of population living in poverty whilst increasing inequality as indicated in the findings of the study.

KEY TERMS: Poverty, inequality, financial intermediation, financial efficiency, financial access, financial stability, cointegration, causality.

ACKNOWLEDGEMENTS

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Finally, my appreciation goes to Dr William Mpofu, for providing editorial assistance.

Apart from the supervision and input from the aforementioned individuals, the obligation for all the opinions and any deficiencies in this thesis is entirely mine.

LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
AR	Autoregressive
ARDL	Autoregressive Distributed-Lag
ATMs	Automated teller machines
BCG	Boston Consulting Group
BoP	Bottom of the Pyramid
CGAP	Consultative Group to Assist the Poor
DFE	Dynamic Fixed Effects
DPD	Domestic Public Debt
DTI	Department of Trade and Industry
ECT	Error Correction Term
EIB	European Investment Bank
FE	Fixed Effects
FOD	Forward Orthogonal Deviation
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GDPC	Gross Domestic Product Per Capita
GMM	Generalised Method of Moments
ICRG	International Country Risk Guide
IMF	International Monetary Fund
IPS	Im, Peseran and Shin
IS	Interest rate spread
LLC	Levin, Lin and Chu
LSDV	Least Square Dummy Variable
MG	Mean Group
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares

PCA	Principal Component Analysis
PCREDIT	Private Credit
PMG	Pooled Mean Group
RE	Random Effects
REM	Remittances
GLS	General Least Squares
SDGs	Sustainable development Goals
SMEs	Small and Medium Enterprises
UNDP	United Nations Development Programme
ECM	Error correction Model
WDI	World Development Indicators

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CHAPTER 1

BACKGROUND, CONTEXT AND SETTING OF THE STUDY

1 Introduction

The present chapter foregrounds the study by delineating the background, context and setting of the research. Notably, according to the World Bank (2017) about two billion people don't use formal financial services with above 50% of unbanked adults in the poorest families. Access and use of sustainable finance is understood to be an approach to poverty reduction. The Sustainable Development Goals (SDGs) (2015) do not explicitly list formal financial access as a target to be achieved nor is access to finance listed as a development goal (CGAP, 2012). However, it remains a puzzle for example, on how there is going to be a reduction of extreme poverty if the poor people are inadequately served with financial vehicles that improve their savings, consumption and risk management options. Financial intermediation should be of social value in that its direct significance to the ordinary individual is to provide sustainable financial products services (Gurley and Shaw, 1955).

1.1 Background

The direct significance of financial intermediation to the average person is to efficiently mobilise and allocate resources including risk management. The expectation of meeting the SDGs by mobilising domestic resources and private finance seems to be inadequate for the developing countries (Consultative Group to Assist the Poor (CGAP), 2012). The empirical literature has ample assertions that the improvements in finance expands the economic opportunities to the poor and reduce poverty, yet, there is a scarcity of empirical research on the presumed effect of formal financial dimensions on persistent poverty. Furthermore, there is a deficiency of an empirical research in considering the joint evolution and effect of financial dimensions to poverty reduction. Demirgüç-Kunt and Levine (2009) argue that well-functioning formal financial sectors assist the poor in improving their livelihood and enabling them to participate in the formal economy.

The argument on the role of finance in the real economy is mainly centred on its effects on economic growth (Ravallion and Datt 2002; Dollar and Kraay 2002; Sehrawat and Giri, 2016). Deaton (2013), however, assert that irrespective of having progressive economic growth, some countries have escaped poverty but others were left behind. It is therefore the aim of this study to examine the aspects of finance that act as a catalyst to poverty reduction than the ones working through economic growth. This study acknowledges the link between finance and growth in poverty reduction that has been comprehensively covered in literature (see Aghion and Bolton, 1997; Demirguc-Kunt, Klapper and Singer; 2017).

The finance-growth channel in poverty reduction is not going to be discussed in further detail as the study seek to examine other channels of influence in which financial intermediation can reduce poverty. Demirgüç-Kunt and Levine (2009) argue that the persistence of inequality across generations is shaped by finance and the financial effects in the real sector have ramifications to income distribution and poverty. Previous studies on the role of finance in poverty reduction have either focused on the indirect relationship via economic growth or have mainly looked at the financial development aspects such as the depth of the banking sector and the size of the stock market (Beck, Demirgüç-Kunt and Levine; 2007). Recent data has shown that the size of the financial market which is mainly represented by financial development does not necessarily mean access, efficiency or stability of the financial services (Cihák et al., 2013). Furthermore questions have been raised if financial intermediation is really beneficial to the poor or the advocacy for inclusive intermediation is merely an introduction of innovative providers with new product to a different target market (Cull, Demirgüç-Kunt and Morduch, 2013: 1; Mader, 2018). In some instances an increase in the depth of the financial sector is accompanied by increased financial instability which affects the poor more than the rich as they lack hedging instruments against financial shocks (Demirgüç-Kunt and Levine, 2009).

The World Bank's Enterprise Survey listed access to finance as among the constraints by the small and medium scale enterprises (SMEs). Honohan and King (2013) argue that in Africa access to formal financial services varies significantly with eight percent in Mozambique and fifty four percent in South Africa. Increased lending to the public sector in recent years has constrained the formal financial access of the SMEs

(European Investment Bank (EIB), 2018). The European Investment Bank observed an increase in issuance of public debt between the period 2014-2018 by some banks in Africa, particularly in Ghana, Niger, Zambia and Tanzania. The increase in alternative investment through the issuance of public debt has caused significant crowding out as lending rates increases in a number of African countries has constrained the access to credit by small enterprises (EIB, 2018).

According to Cruz, Foster, Quillin and Schellekens (2015) the past decades have realised shifts in the composition of poverty among the poor regions of the world. For the past decades ninety five percent of the global poverty was concentrated in East Asia and Pacific, South Asia, and Sub-Saharan Africa (Cruz et al., 2015). In the 1990s fifty percent of the global poverty was concentrated in East Asia with fifteen percent in Sub-Saharan Africa (World Bank, 2015). However, by 2015 there was a shift in poverty concentration with more than half of global poverty concentrated in Sub-Saharan Africa whilst twelve percent is in East Asia (World Bank, 2015).

Poverty affects the majority of the world's population and denies the poor of meeting their basic needs which includes financial services, education, healthcare and sanitation among others (see Kandachar and Halme, 2017:10; Calder, 2007; Cheema, 2005:5). Prahalad and Hart (2002) argue that serving the poor in a way that is responsive to their needs is an effective poverty reduction mechanism. Formal finance is regarded as the link to achieve the SDGs (Klapper, El-Zoghbi and Hess, 2016). The formal financial services act as an enabler to achieving SDGs if the poor people are actively and successfully using formal financial products and services sustainably such as deposits and savings accounts, payment services, credit and insurance to meet their specific needs (CGAP, 2011).

Use of these formal financial services has a direct social value to the average individual (Honohan, 2008). The payments systems provided by the financial sector should be able to transfer money between people or firms in different places with minute inconveniences at minimum costs (Aguero, 2015). In the absence of efficient formal financial intermediation, use of informal services by the poor results in 'poverty penalty' that is the poor ends up paying more for financial services than their richer counterparts (Hammond et al., 2007). This view supported the previous assertion by

Wright and Muteesassira (2001) that 99% of the poor reported loss incidences of savings in the informal sector compared to 15% reports for the formal sector. Limited access to formal financial services forces poor households to rely on risky and expensive options and this has stifled economic progress of poor households (Nayaran, 2000; Hammond et al., 2007). Risk-return considerations by formal financial intermediaries discriminates the poor and low income households from access and use of formal financial services (Baradaran, 2012). Access to formal financial services can help people safeguard their earnings, manage risks, payments transactions and entrepreneurial activities (World Bank, 2017).

The penetration rate of formal finance is very low in the poor households as the distribution models of the formal financial systems do not cater for the needs of this market (see Deloitte, 2017; World Bank, 2017). Formal financial intermediaries have one-size-fits-all type of products and services which are easier to implement at lower costs for the financial institutions (Honohan and King, 2013). However, this does not necessarily offer the flexibility that poor consumers need to manage inconsistent cash flows. Active participation in the formal financial system enables people to pay for large expenses such as education; they are able to manage risk and entrepreneurial ventures (Hung, Yoong and Brown, 2012). According to the World Bank (2016), there are disparities in the access and use of formal financial services which varies with and across countries. China, India and Korea are examples of once poor countries which have made great inroads in poverty reduction whilst most African and Caribbean countries are left behind (see Deaton, 2013).

Most of the existing formal financial products and services are not working any better for the the low income earners (FinMark Trust, 2018). People have to evolve around the offered financial products, taking products as given than the products evolving to the needs of the people (Honohan and King, 2013; Hung et al., 2012). Bending et al., (2015) asserted that most banks in developing and emerging markets focus their lending activity to corporate financing and governments. This has largely discriminated SMEs, poor households with a larger population remaining unbanked (Bending et al., 2015). There is ample research that has been done on the finance-growth nexus, but most focused on finance and poverty reduction as an indirect relationship via the economic growth channel (see Odhiambo, 2009; Herwartz and Walle, 2014).

Economic growth is muted to be further hampered by inequality, hence in economies with high inequalities economic growth might be essential but not adequate for poverty reduction (Fosu, 2017).

Dabla-Norris et al (2015) found that a percentage point increase in income of the rich slows economic growth by 0.08 percentage points. A corresponding rise in income of the poorest 20 percent increases the economic growth by 0.38 percentage points. It is therefore noteworthy in this study to look at the other channels in that finance can be a catalyst for poverty reduction. Little has been done to interrogate the direct relationship between finance and poverty reduction and the channels in which finance has a direct role in poverty reduction. Fanta and Makina (2017) concur that the study on the role of finance in the real economy remains incomplete citing endogeneity problems and use of weak proxies among other reasons.

Irrespective of progress in poverty reduction, why does poverty persist and is there anything that can be done? Can there be other channels besides the economic growth channel in which formal finance can be an epitome for poverty reduction? In this study we will examine the other characteristic of finance such as the efficiency, access and the stability in the financial intermediation setting. Rewilak (2013) argues that full benefits of the financial sector depend on the location of the poor people. Furthermore, there are limited studies which have included the impact of other financial dimension such as financial efficiency, financial access, financial stability and institutional quality (from a developed index using principal component analysis) in studying how financial intermediation affects poverty reduction.

Following the studies by Zhang and Naceur (2018) and Rewilak (2017) this study will look at four dimensions of financial intermediation (depth, access, efficiency and stability) in poverty reduction. The four dimensions have been included in the study because examining only one dimension of the role of finance in poverty reduction such as financial depth misses the other aspects as the financial systems are multidimensional. This study examines the effect of financial intermediation on poverty reduction without focusing specifically on the growth impact. For easy reading the term developing countries will be used in reference to both developing countries and emerging economies.

1.2 Problem statement

This study notes that poverty is a social and political challenge that most developing countries of the world are burdened with. The United Nations Development Programme (UNDP) cited concerns of inequalities in income distribution in countries that have progressively succeeded in reducing poverty such as China and India (UNDP, 2017). Active use of formal financial products and services in most transition and developing economies is mainly by the middle-upper class. Use of formal financial products by the poor and low income earners is faced by several challenges that range from cost, lack of suitable products and unavailability of an intermediary in the close proximity of where people live (World Bank, 2016). In most developing economies the formal financial sector is underdeveloped and underserving the poor with little or no use of formal financial services by the poor (Bill and Melinda Gates Foundation, no date). According to the Global Financial Index (2017) thirty-one percent of the global population remains unbanked. Of this unbanked population only three percent listed that they do not have an account with a financial institution because they do not need one as the only reason for not having a formal bank account (World Bank, 2017). Klapper, El-Zoghbi and Hess (2016) questioned the efficacy of SDGs short of getting more people to participate in formal financial services. Access and use of sustainable finance by the poor and low income households has been muted as a tool or an enabler for poverty reduction (World Bank, 2016; Finmark Trust, 2018). However, the use of the formal financial products by the poor and the low income households is dependent on understanding the complexity of the available products and the trust on the formal financial system (Nanziri, 2016).

The World Bank (2019) lamented the uneven progress in poverty reduction across the regions of the world. Significant poverty was reduced in East Asia and the Pacific (47 million extreme poor), South Asia (7 million) whilst Sub-Saharan Africa made little progress in reducing extreme poverty. The Sub-Saharan Africa region only managed to reduce poverty by four million. By 2015 Sub-Sahara Africa had 413 million people living on less than US$1.90 which is more than all the other regions combined (World Bank, 2019) The International Monetary Fund (IMF), (2017) and the Organization for Economic Cooperation and Development (OECD), (2017), singled out economic growth as the most important factor in poverty reduction.

However, even with stable economic growth countries have failed to significantly reduce poverty (see Fosu, 2017). Can there be other channels, which policy makers can look for, to enable a fair distribution of formal financial services for poverty reduction than the finance-growth channel that to date has ample empirical evidence available? Why would other countries irrespective of economic growth be able to make progress in poverty reduction than others? This study tackles the role of financial intermediation, financial efficiency, financial access and financial stability to bring to light if there are other channels in which formal finance affects poverty. The renewed interest in finance for all by development agencies, governments and the private sector requires a better understanding of the relationship between financial intermediation, the other financial dimension of finance and poverty. This understanding is crucial as to avoid policy distortion in addressing poverty in developing countries. This study seeks to examine potential channels in which formal finance can enhance the efforts to reduce poverty in selected developing countries.

1.3 Objectives of the Study

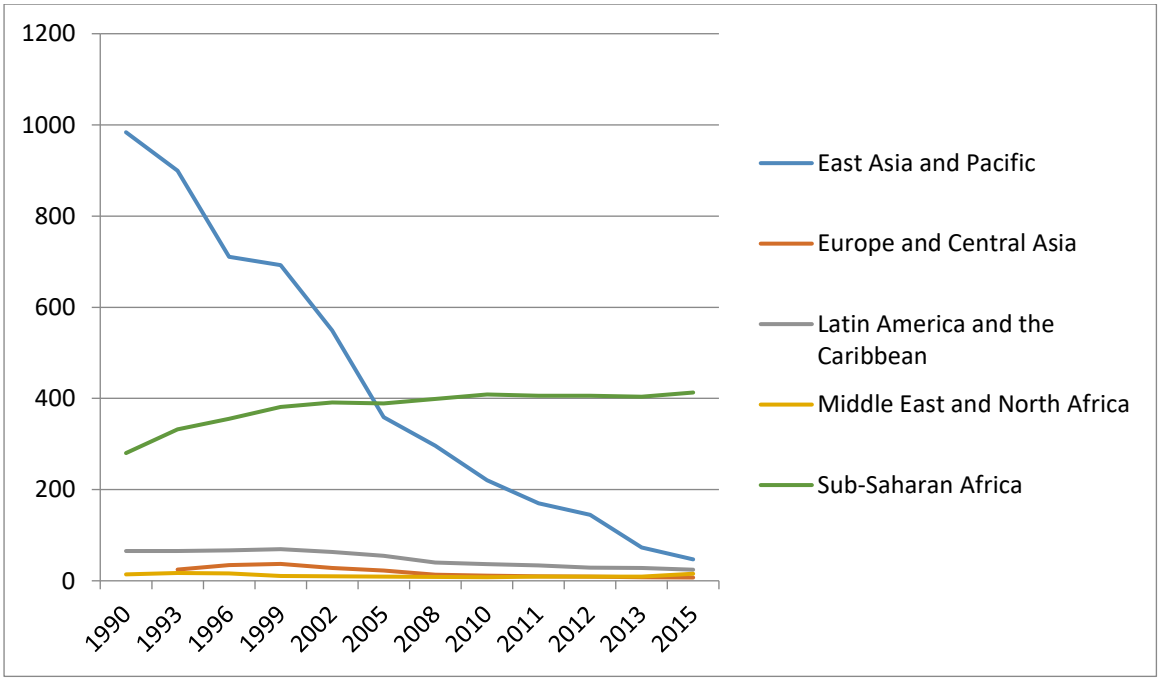
- To examine the deterministic relationship between financial intermediation and poverty among selected developing countries over the period from 2004 to 2016.
- To examine the cointegrating relationship between financial intermediation and poverty among selected developing countries over the period from 2004 to 2016.
- To examine the causality effects between poverty and financial intermediation among selected developing countries over the period from 2004 to 2016.

1.4 Overview of poverty in emerging economies

There are disparities in poverty reduction in developing economies; some countries have made significant reduction in poverty yet in others the poverty rate is declining with an increasing number of people who are living below the poverty line of $1.90 a day (World Bank, 2019). Developing economies that have significantly lifted a sizeable population out of extreme poverty include China, India and Indonesia. In terms of

economic size, gross domestic product per capita and population the developing countries is comprised of a heterogeneous group (OECD, 2010). According to the World Bank (2019) the majority of the world's poor live in rural areas, have low education literacy levels, mainly employed in the agricultural sectors and are under 18 years of age. Comparing with other regions Sub-Sahara Africa is lagging in reducing poverty as the region has realised a 9 million increase of number of people living in poverty from approximately 404 million in 2013 to about 413 million in 2015 (PovCalNet, 2019). Figure 1.1 provides a trend of the population of people living in poverty for the regional aggregates as provided by the PovCalNet of the World Bank. The latest data available from the World Bank is for the year 2015 hence the study couldn't provide the trends for the latest years the survey is done in intervals.

Figure 1.1: Trends in poverty (population) by region, 1990–2015

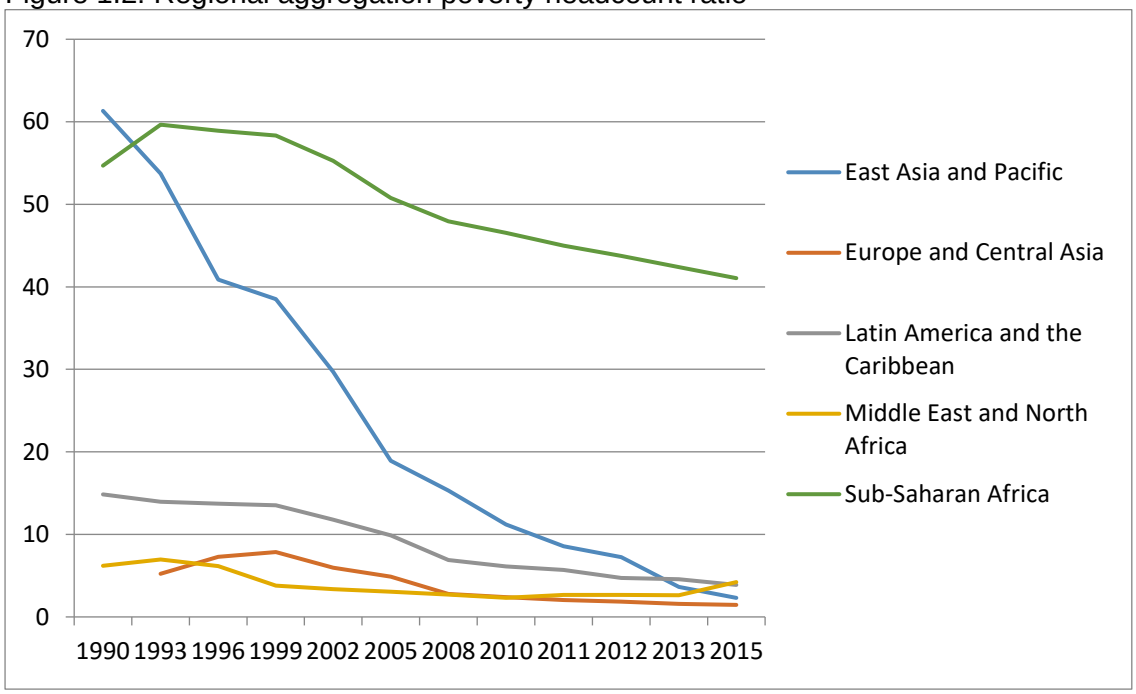


Source: PovcalNet, 2019

Poverty in the East Asia and the Pacific has been gradually decreasing from an estimate of 983.88 million in 1990 to about 47 million in 2015. Additionally, gradual decrease in the share of individuals living in poverty is observed for Europe and Central Asia and Latin America and the Caribbean. However, Sub-Saharan Africa, the Middle East and North Africa (MENA) had more poor people in the year 2015 than they had in 1990. The number of poor people living below the poverty line of $1.90 in SSA has almost double its 1990 figure from 280.15 million in 1990 to 412.99 in 2015.

The United Nations estimated that the World has 736 million poor people of which about 56% (413 million) are in Africa (United Nations Department of Economic and Social Affairs (UN DESA), 2019) The World Bank (2019) opined that the number of people living in poverty is increasing for fragile states. Extreme poverty in the developing areas is now concentrated in hard to reach areas such as the rural areas and in fragile states (World Bank, 2019).The developing economies faces the risk of temporarily lifting out people out of poverty as other factors such as economic shocks and the climate change wipes out the gains and force people back into poverty. Poverty at birth often implies being the recipient of less investment in human development which is more often a precursor of the standard of living in the future (Beegle, Christiaensen, Dabalen and Gaddis, 2016). The poverty trends in population in Table 1 can be summarised in a trend in Figure 1.1.

Figure 1.2: Regional aggregation poverty headcount ratio

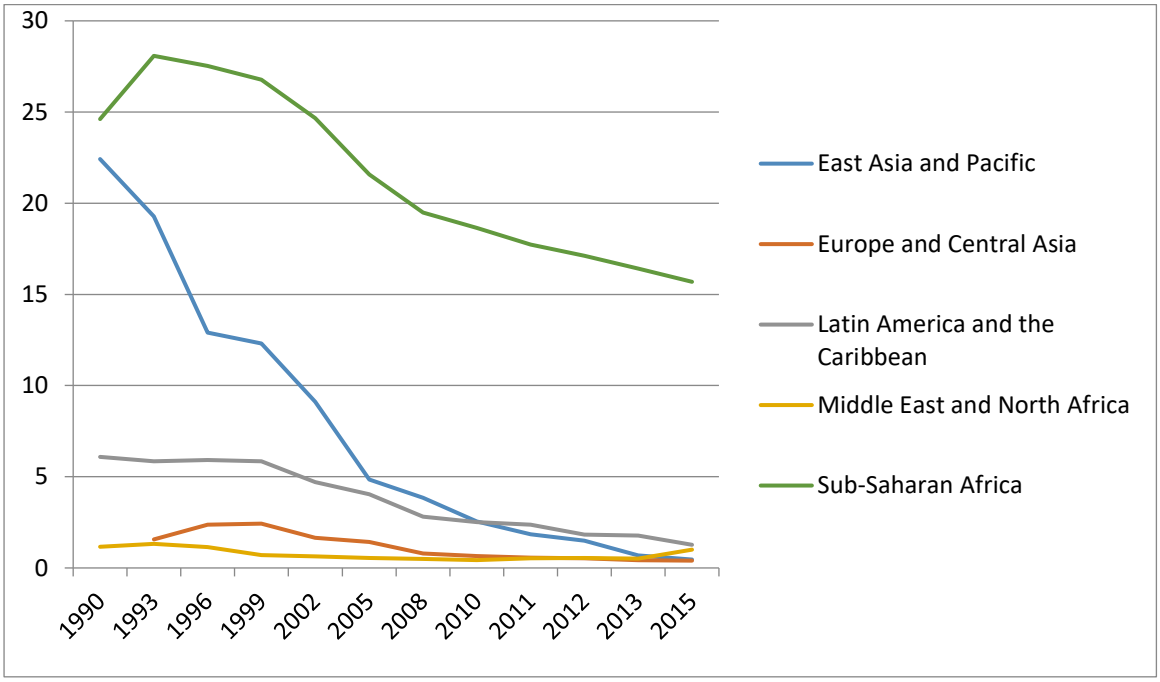


Source: PovcalNet, 2019

The data from the PolvCalnet shows that the headcount ratio is decreasing for all the regions using the poverty headcount ratio of $1.90 at the 2011 purchasing power parity. Sub-Saharan Africa has the highest share of the population of people living in poverty as compared with the other regions. East Asia and Pacific is the region that is realising a continuous sharp fall in the share of the population that is leaving below the poverty line. Comparing Figures 1.1, 1.2 and 1.3 the Sub-Saharan Africa has a

decreasing trend in poverty headcount ratio and the poverty gap whilst the number of people living in poverty has an uptrend. The figures from the World Bank, estimates that the share of the population from 54,69 in 1990 to 41,05 in 2015. In the same period the number of people living in poverty has increased from 280,15 in 1990 to 412,99 in 2015. The latest figures from the World Bank (2019) have attributed this growth in number of people living in poverty to rapid population growth. Figure 1.3 alternatively shows poverty as measured by the poverty gap and the poverty trends are not significantly different from Figure 1.2.

Figure 1.3: Regional aggregation of poverty gap



Source: PovcalNet, 2019

Poverty gap is an alternative measure of poverty and the trend in the poverty gap for the regions. Sub-Saharan Africa remains the region with the highest poverty gap although it has been decreasing since 1990. East Asia and the Pacific has the sharpest decline in poverty gap from a high of 22,42% in 1990 to 0,46 in 2015.region The financial sector has been opined to be instrumental in reducing poverty and section 5 discusses the trends in the financial sector development in developing economies.

1.5 Financial intermediation in emerging economies

In developing economies the efficiency of the financial system is crucial to unlock the expansion of economic opportunities and reduce poverty and inequality. Poverty and inequality are abridged as the breadth of finance to the poor and the marginalised areas such as rural areas is increased. To date there is no explicit definition of financial sector development but it broadly refers to better efficiency and effectiveness of the sector; with a wide range of financial products and services, sustainably inclusive with varied institutions functioning in the sector, improved financial intermediation; and expansion in the regulation and stability of the sector. Furthermore financial development reduces vulnerability to shock by facilitating risk management and promote generation of higher income through facilitation of capital accumulation (Greenwood and Jovanovic, 1990; Beck et al., 2007 and Naceur and Zhang, 2018). The World Bank (2019) summarised that financial sector development arises as the financial markets eases the 'costs' of finance and efficiently deliver the key functions of finance (discussed further in Chapter 2 and 3) sustainably.

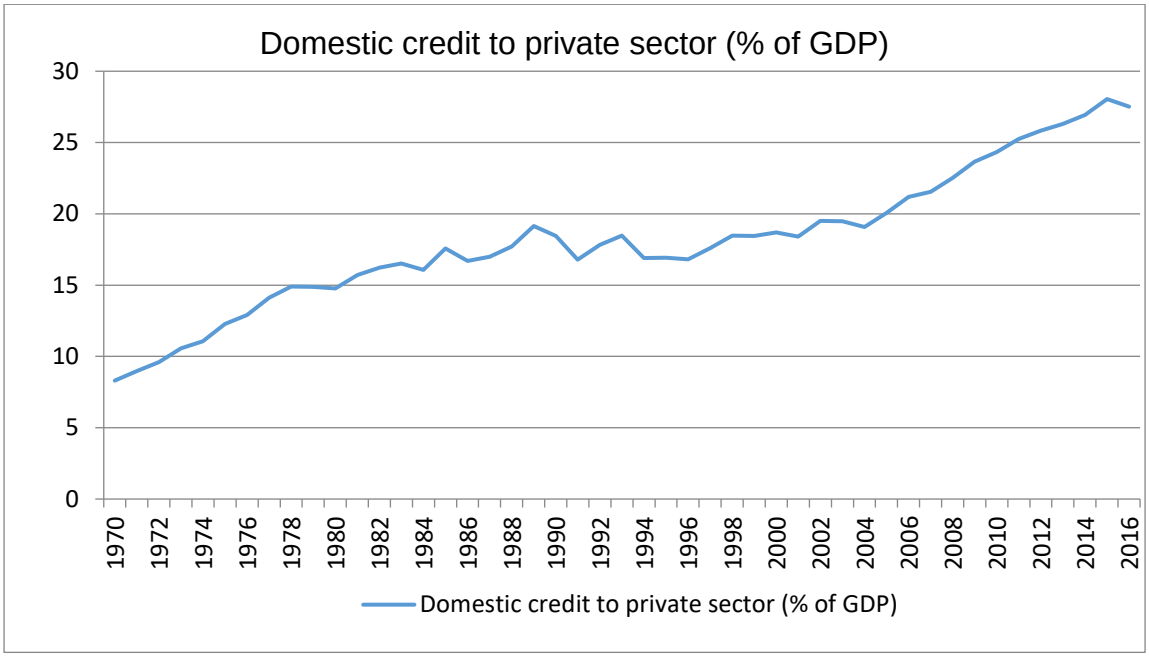
According to Bill and Melinda Gates (no date) the poor mainly transact in cash and more often find the services for the formal financial services expensive as the products are not designed to suit the needs of the population living in poverty. Access to formal finance without the financial histories among the poor has hindered them from potentially using the formal finance which has the capacity of lifting them out of poverty (Levine, 2008). Levine (2000) argued that the imperfections in the financial markets help in the maintaining persistence poverty. The supply side perspective on why the population living in poverty lacks access and use of formal financial services is making inroads in finding solutions for developing economies. However the demand side is under researched how poverty in developing economies affects the formal financial sector development.

There is dearth of empirical studies on the effect of poverty on the financial sector but intuitively there seem to be a correlation between poverty and the financial sector dimensions of financial intermediation, financial access, financial efficiency and financial stability. For most countries that have high poverty rates the financial sector is not well developed. More often poor countries have high market volatility and low institutional stability which can potentially increase the instability of the financial sector (World Economic Forum, 2016). Bill and Melinda Gates Foundation (no date) posits

that the poor mainly save in physical assets, such as livestock or jewellery. This results in the lack of liquid assets which are crucial for effective and efficient intermediation of financial resources. The behavioural finance theory in section 2.3 further discusses cognitive functions of individuals and inappropriate economic decision-making which in turn can directly influence how the poor use the financial services which might affect the provision of services by the financial sector

The financial system is comprised of the bank and non-bank financial sector, the stock market and the bond market. For most developing countries the financial systems are still in their infancy with little or no formal financial access by the majority of the population especially the poor households, small businesses and in rural areas (World Bank, 2016). The development of the financial sector in emerging economies can be described in the three tiers banking sector, financial markets and the bond markets. Financial liberalisation as from the 1980 brought the relative growth in the size of the financial markets of developing economies (Adelegan and Radzewicz-Bak, 2009). In most developing economies particularly in Sub-Sahara Africa the banking sector is the major source of external finance for companies (Gries, Kraft and Meierrieks, 2009; Samargandi, Fidrmuc, and Ghosh, 2015; Svirydzenka, 2016). In the early 1990 there were improvements in the bank balance sheet and the increasing demand for loans such that the bank credit to the private sector has been on the increase for most developing economies (Svirydzenka, 2016).

Figure 1.4: Credit to the Private Sector by Groups of Countries from the selected developing countries (1970-2016).

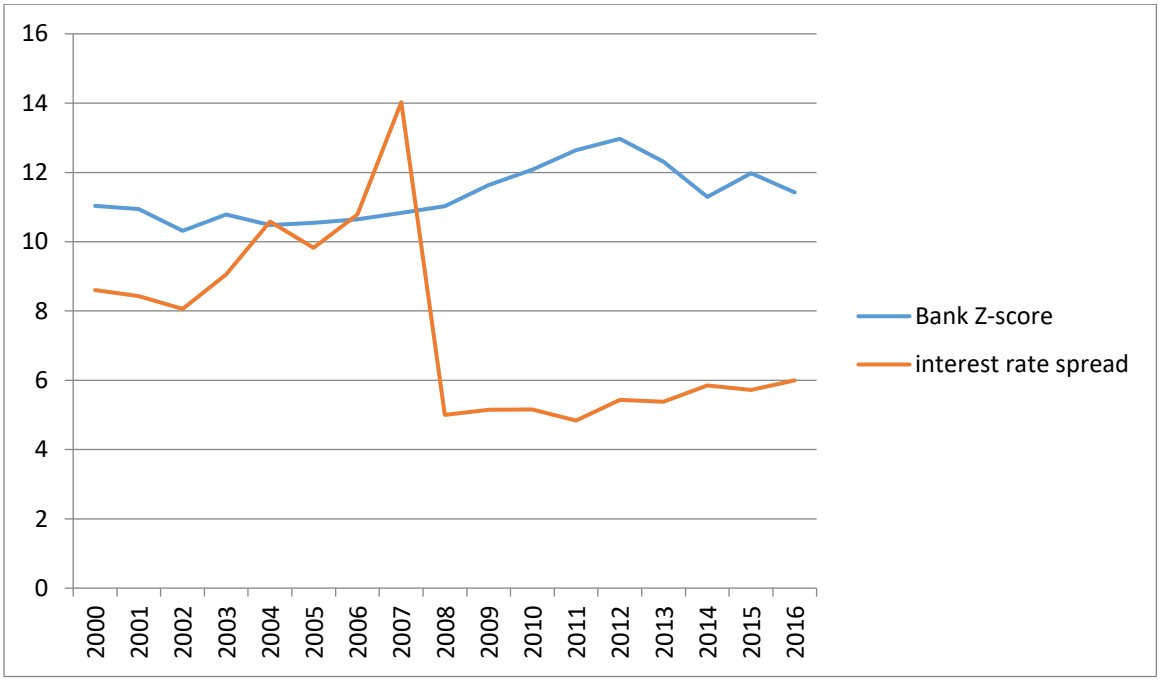


Source: Authors' own calculations, based on World Development Indicators data

There is an uptrend in domestic credit to the private sector for the sample of the developing countries in our study. The expansion of credit to the private sector implies development in the financial sector (Beck et al., 2007; De Haan and Sturm, 2017). The private credit to the private sector as a share of the gross domestic product has an ascending trend. The credit extended to the baking sector is the developing countries vary with other countries having very shallow bank credit to the private sector whilst in other countries banking sectors is deep (Beck and Cull, 2013). As from 2004 on average the credit extended to the private sector was on the increase from an average of 19.08% of GDP in 2004 to an average of 27.25% GDP for the developing countries in our study. The expansion of credit to the private sector implies development in the financial sector (Beck et al., 2007; De Haan and Sturm, 2017).

Figure 1.2 gives the trend of the other characteristics of finance namely financial stability and financial efficiency. Figure 1.2 illustrates the interest rate spread and the bank z score. The banking sector in the developing countries is largely oligopolistic in nature with larger interest rate spread (European Investment Bank, 2018).

Figure 1.5: Trend in the bank Z-score and the interest rate spread of the selected developing countries

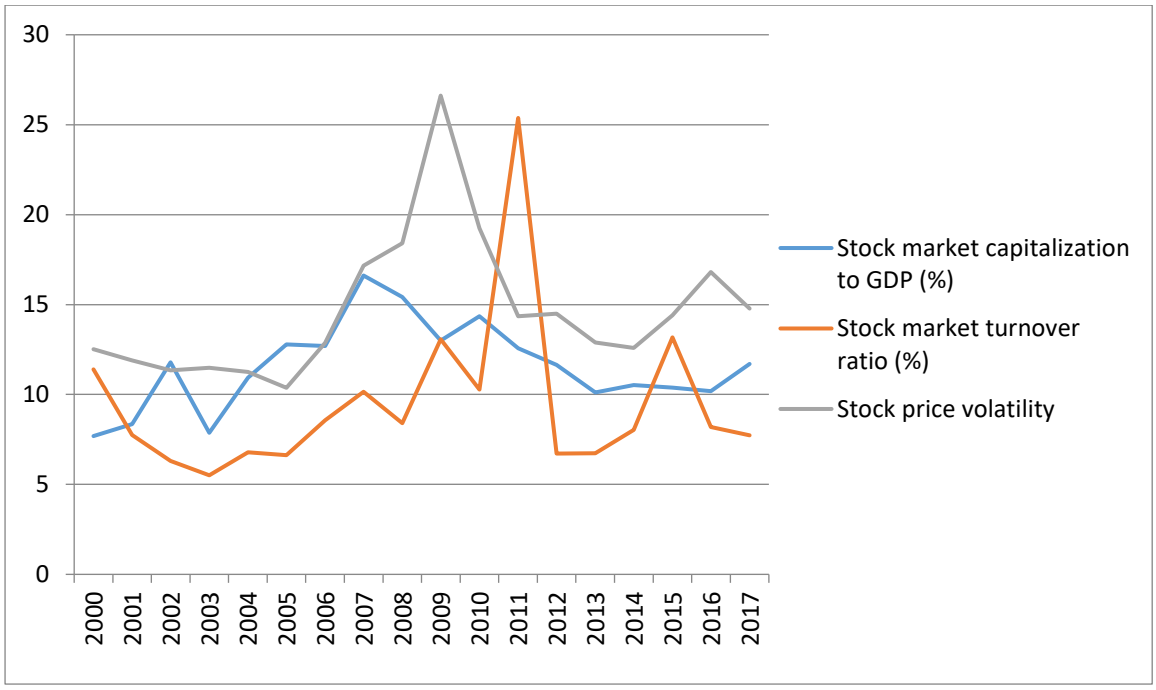


Source: Authors own calculations from the World Bank data

On average the highest spread was 14% in 2007 and has slowed to an average of 6 percent in 2016 (Figure 1.2). There was a sharp decline of the interest rate spread between 2005/8 with an increasing trend as from 2011. The interest rate spread captures the efficiency of the banking sector in the selected developing economies under this study. The bank z-score had a stable increasing between 2000 and 2012. Although the banking sector in the developing countries is the major source of external finance other developing countries also have an active stock market although. In developing countries the development of the stock market is heterogeneous across countries. The stock market for the developing countries under analysis is still in its infancy and very small, not all countries have active stock market. Since the 2007 (see Figure 1.3) the capitalisation of the stock market has been on the decline casting doubt on the deepening of the stock market of the developing countries Some countries such as South Africa have a very well developed stock market whilst other countries such as Angola will launch its stock exchange in 2019. Some countries still do not have their own stock exchange or they are served by a single bourse for a group of countries. For example, the Bourse Régionale des Valeurs Mobilières SA (BRVM) in Côte d'Ivoire serves eight countries namely Benin, Burkina Faso, Guinea Bissau, Côte

d'Ivoire, Mali, Niger, Senegal and Togo. The BRVM have 72 listing as of 2016 whilst South Africa had 388 listings (European Investment Bank, 2018).

Figure 1.6: Stock market trends in selected developing countries



Source: Authors own calculation from the World Bank data

The trend from the stock market is obtained by averaging the data from the World Bank Indicators using the sample of countries in our study. There is a sharp increase on the capitalisation of the stock market between 2005-2009 where the capitalisation of the stock market hard a sharp decline. The stock market capitalisation as a percentage to the gross domestic product estimates the depth of the stock market in the developing countries. Although there is an increase in the capitalisation of the stock market few countries in the sample have active stock market. The stock market turnover ratio increased sharply in 2010/2011 with a sharp decline in 2011/2012. The stock prices volatility was on an increasing trend in 2005-2009 with a sharp decline in 2009-2011. For the stock market data from the World Bank data was available for a panel of between 7 and 23 depending on the year. The bond market development in most developing countries is very shallow except for a few exceptions.

1.5.1 Opportunities and challenges in the developing economies financial markets

There still exists development and financial stability challenges such that the financial system hasn't maximised its effect on the real economy of these economies relative to the developed economies. Innovation, consolidation, privatisation and the entry of foreign banks in emerging markets are some of the improvements experienced in the developing economies banking systems (Mihaljek, 2006). Within the last decade the banking industry has come up with creating ways of customer services and improving access to finance. In Indonesia, Bank Rakyat Indonesia (BRI) has launched a 'floating' bank branch to provide ordinary banking services for people who live on remote islands (Gulf Times, 2016). To improve financial access for the people who live on islands, the state owned bank has transformed a shipping vessel into a fully-fledged banking branch (Gulf Times, 2016). In Poland, a mobile Automated Teller Machine (ATM) was introduced and customers can book banking services such as deposits and cash withdrawals using a mobile application at a place and time of their convenience (Ernst and Young, 2016). In Kenya, banks partnered with providers of mobile for credit risk assessment of first time bank customers (Ernst and Young, 2016). These are some of the innovative ways that the banking industry has come up with to improve financial intermediation to the previously unbanked population. Africa mobile money has come up with innovative ways of banking the previously unbanked.

The emergence of financial technology (Fintech) is changing the global banking landscape but it remains to be empirically tested whether banks in developing economies should embrace more fintech in place of relationship banking given the infrastructure challenges of the already marginalised rural areas. The financial systems in the developing markets particularly the banking sector has been facing innovation threats from fintech companies (KPMG, 2016). As a result the sector faces a challenge of finding a balance between the traditionalists' customer (those who prefer using the traditional banking systems) and the online embracers (customers who frequently use the digital channels) (Deloitte, 2018). According to the Deloitte Centre for Financial Services (2018) report, the bank branch gratification has higher effect on the whole customer satisfaction than the digital influence for all of these groups of customers. Financial technology (Fintech) in developing economies promises to increase competition and unlock access to formal financial service relative to the developed economies (International Finance Corporation (IFC), 2017). There are challenges that are likely to impact the maximum benefits of fintech which include

low permeation of formal financial services, inadequate income, low financial literacy levels and underdeveloped infrastructure in developing economies (IFC, 2017).

Globalisation has increased the presence of foreign banks in the developing countries' financial markets. This has brought with it cross border banking opportunities and challenges in the financial systems of the developing countries (World Bank, 2017). The presence of foreign banks in the developing economies is not a guarantee to financial development and stability. The 2008 financial crisis reduced trust in financial institutions, and the regulatory response to the crisis, including increased capital requirements and compliance costs, and made it more difficult and expensive for banks to lend. In most developing countries there are challenges of expanding the financial services to the larger segment of the populace (Beck and Maimbo, 2013) Given the opportunities and the challenges that the financial sector faces in the developing countries, finance can overcome the challenges deliver the financial products and services to reduce poverty and inequality in developing countries.

1.6 Chapter overview

The study comprises of six chapters, which are organised as follows:

Chapter 1: This chapter presents the introduction and background of the study, the research objective, hypotheses and significance of the study are also fleshed out. The chapter also maps the outlook of the rest of the study.

Chapter 2: This chapter conducts a review of the theoretical literature. In addition the chapter also highlights the poverty and inequality in the developing economies and briefly outlines the challenges that the poor face in accessing financial products and services.

Chapter 3: This chapter provides comprehensive engagement with empirical literature on financial intermediation and poverty.

Chapter 4: The chapter develops the hypotheses of the study. The research problem is logically developed into a measurable hypothesis using the objectives of the study. The nexus between poverty and its determinants are further discussed.

Chapter 5: This chapter discusses the methodology that is deployed in the study, namely the research design, empirical model specification and the estimation techniques. Also discussed are the identified sample and data analysis. The General Method of Moments (GMM) is discussed as the method used to determine the relationship between poverty and financial intermediation including the other selected control variables. The diagnostic tests that were performed before performing the GMM and the cointegration tests such as, descriptive statistics, correlation, unit root tests are also discussed. For the cointegration short run and the causality effects between financial poverty and the financial variables the study uses the Autoregressive Distributed Lags (ARDL). The model specification for the Autoregressive Distributed Lags and the Error Correction Model (ECM) are discussed this chapter.

Chapter 6: The chapter presents and discusses the empirical results of the study. The Chapter tests the hypothesis developed in chapter 4 using the econometric methods discussed in Chapter 5. The determinants of poverty are empirically tested by regressing them against the determinants of the study.

Chapter 7: This chapter completes the study by summarising the study and outlining policy implications and recommendations. The limitations of the study are explained and areas of further research suggested. The chapter also provides an explication of how this study contributes to the body of knowledge in light of how financial intermediation can be an enabler to poverty reduction in developing countries.

CHAPTER 2

THEORETICAL LITERATURE REVIEW

2. Introduction

This chapter aims to explore the theoretical literature that is relevant to the objectives of the present study. Fleshed out in this chapter are a number of theories which explain how the process of financial intermediation can influence individual welfare thereby improving their economic well-being? This chapter, therefore, delves a review of the theoretical literature on the role of financial intermediation in poverty reduction. Section 2.1 defines and summarises financial intermediation. Sub-sections 2.1.1 and 2.1.2 define and summarise the key terms of the study that are financial intermediation and poverty respectively. Subsection 2.2 discusses the financial intermediation theories. Additionally, section discusses theories on the determinants of poverty, the determinants of poverty are identified in subsection 2.4 whilst theories that link financial intermediation and the gross domestic product per capita or economic growth are discussed in subsection 2.5. In that way, this chapter combines both the theoretical framework and literature review of the study.

2.1 Definition of key terms

2.1.1 Financial intermediation

Financial intermediation is a value creation process in which an institutional entity (intermediary) incurs liabilities on its own account by engaging in financial transactions for the purpose of acquiring financial assets (OECD, 2007). Intermediaries for the purpose of this study will focus on deposit taking institutions (banks) who hold financial claims as assets and channel funds to firms and individuals for a profit (see Allen and Santomero, 1997; Mitchell, 2016). The role of financial intermediaries is to channel funds from savers to borrowers by intermediating between them (Lehr, 1999; Gorton and Winton, 2003; OECD, 2007).

The role of financial intermediation in the real economy builds on the existence of the ability of financial intermediation in liquidity provision and risk transformation (Claus and Grimes, 2003). According to Claus and Grimes (2003), intermediaries can enhance risk sharing and welfare by providing better risk sharing among agents who need to consume at random times thereby enhancing risk sharing and welfare. The role of financial intermediaries in poverty reduction is mainly centred on the role intermediaries play in the real economy (see Rother, 1999). The resource pooling ability of financial intermediaries from savers and the redistribution of the pooled resource for productive activity further explains the existence of financial intermediaries (Pagano, 1993).

Financial intermediation is vital in raising economic wellbeing and factor productivity as the financial sector mobilises savings which they reallocate to the productive sector of the economy at low cost (McKinnon, 1973; Shaw, 1973; Greenwood and Jovanovic, 1990; King and Levine, 1993; Levine and Zervos, 1998; Beck et al., 2000; Schumpeter, 2017; Rewilak, 2017). The ability of the financial intermediaries in resource mobilisation is not only beneficial for capital accumulation but it has also a poverty reducing effect if the pooled resources are available to the poor (Shaw, 1973 and Pagano, 1993). Greenwood and Jovanovic (1990) argues that the high costs of participation in the formal finance system limits the poor from using the financial services. The financial sector can be instrumental in reducing need and vulnerability profitably among the poor, be it access to credit, access to disaster insurance, savings and consumption smoothing (Burgess and Pande, 2005). Direct lending in the financial markets with information asymmetry is not possible and therefore, individuals with surplus finance use financial intermediaries as they have information and monitoring advantage (Ramakrishnan and Thakor, 1984; Allen, 1990). The Sustainable Development Goals 2015-2030 stresses eradication of extreme poverty among other goals and the formal finance is widely accepted as a catalyst in rolling out the SDGs (United Nations Development Programme (UNDP), 2017).

2.1.2 Poverty

Historically there has been an attempt to define poverty. Smith (1776) defined poverty as "*the inability to purchase necessities required by nature or custom*". There are so

many definitions of poverty since it is multidimensional (World Bank, 2005; Room, 1995; Whelan and Whelan 1995; Dewilde, 2008). Narayan et al. (2000) defined poverty as absence of material wellbeing, the presence of self-doubt, social isolation, shortage of long term planning horizon and psychological distress. Sengupta (2003) defined poverty as the deficiency of elementary ability to live in dignity including lack of income to buy a basket of basic commodities and services. Having many dimensions has posed a challenge in the measurement of poverty as there is no single generic measurement of poverty (Drewnowski, 1977; Kanbur and Squire, 2001: 187; Sumner, 2007). Poverty can therefore be defined in either absolute or relative terms (see Townsend, 1979; Sen, 1982; 1985) these terms are explained in chapter five under the subsection on the measurement of poverty. Poverty is defined in absolute terms if people fall below an established standard level of needs such as the poverty line (see Drewnowski, 1977) that is delineated in many economies and polities of the world.

The relative term definition of poverty accepts that inequality can also be defined as poverty as the persons' comparative wellbeing with others in the society (Drewnowski, 1977; Iceland, 2005). This is concurrent with (Galbraith 1958: 252) who posited that people are regarded as poor if their income significantly falls below that of the community. Poverty is said to be dynamic as it varies across region as well as time (Drewnowski, 1977; Ravallion, 2010). Townsend (1979) argues that poverty can not only be defined in income terms but also in terms of exclusion of people's participation in the activities which make them feel as part of the society. In 2010 the United Nations came up with a multidimensional poverty index (MPI) as a measure of poverty. Health, education and standard of living are the three vital targets as dimension indicators and the intensity of poverty and the headcount ratio are the poverty measures (see UN, 2010). Given these diverse definitions of poverty, then, there is no universal definition and measurement of poverty (Drewnowski, 1977). This study clearly spells out its elected definition of poverty Chapter 3.

2.2 Imperfect markets

This section seeks to explain the existence of financial intermediation and how the market frictions can create poverty traps as other economic agents fail to adequately

benefit from the existence of financial intermediaries. In a perfect market setting there is no need for financial intermediaries as economic agents directly finance there deficit for investing in entrepreneurial projects. However market failures have given rise to the interrelated problem of information asymmetry and transaction cost which justifies the existence of financial intermediaries as well as why the financial services and products aren't universally provided. Financial intermediaries have the ability of the financial intermediation process in overcoming the market frictions and are able to channel financial resources from surplus to deficit units in the economy (Levine, 1999). The imperfect financial markets determine the extent to which the poor can borrow or save for investment in capital or education (Levine 1997). The existence of the market frictions such as information asymmetry and transaction costs affect the provision of the financial intermediary services that are discussed in detail in section 2.2.1 and section 2.2.2 below.

2.2.1 Information Asymmetry

The foundation of the theory of financial intermediaries is based on information asymmetries. Information asymmetry is present when a party to an economic transaction possesses greater material knowledge than the other party (Akerlof, 1970; Rothschild and Stiglitz, 1976; Merton, 1995). Information asymmetry is among the market failures that severely affect the low income and poor households. However, beside the ability to process information, intermediaries face the challenge of adverse selection in selecting their potential clients (Jappelli and Pagano, 2002). In such cases, financial market frictions such as information asymmetry and transaction costs can create persistent poverty traps (Banerjee and Newman, 1993; Aghion and Bolton, 1997; Rajan and Zingales, 2004).

The information problems in the credit market result in exclusion and credit rationing even during equilibrium in the financial market (Stiglitz and Weiss, 1981). Agents' problems in the financial markets results in adverse selection (borrowers who might be seeking credit might not have the intention of repaying and moral hazard (after the credit has been granted the debtors can use the fund in projects with negative returns or where the lender has no interest in the project (World Bank, no date). As the financial institutions, specifically banks, lack perfect information of bank borrowers the

risk profile of the borrowers increases (Sharpe, 1990). Loan supply at an interest rate that is above the bank optimal rate will be backward bending. In the presence of information asymmetry, adverse selection will result in credit denial to borrowers who are tentatively indistinct from those who receive loans (Stiglitz and Weiss, 1981).

As the information asymmetry results in adverse selection and moral hazard credit is denied even if the borrower is willing to pay a higher interest rate at any terms of the loan (Jaffee and Modigliani, 1969). This results in involuntary exclusion to the financial market as access to the financial products is denied even to individuals who can be bankable (Demirgüç-Kunt, Beck and Honohan, 2008). As access to finance is denied the benefits of financial access such as consumption smoothing and investment in human capital are limited to the few that have access to the financial markets (Zeller and Sharma, 2000).

Financial intermediaries have information advantage in the distribution of funds from surplus to deficit units (Stiglitz and Weiss, 1981; Jaffee and Russell, 1976). In perfect markets with no information asymmetries there is no role for financial intermediation (Allen and Santomero, 1997; Scholtens and van Wensveen, 2000). Intermediation overcomes market frictions and lowers information costs or wealth between households and firms. The capacity of financial intermediaries to reduce transaction costs and improvements in screening and monitoring borrowers mitigate the challenges of asymmetric information in the financial markets (Bhattacharya and Thakor, 1993). This enables access to financial services for starting entrepreneurial ventures thereby increasing household wealth. Financial market imperfections, limit individuals' borrowing capacity to the level of their initial wealth, alienating the poor from investing in investment ventures with higher returns (Banerjee and Newman 1993). In this case information asymmetries generate poverty traps and income inequalities in that the poor are denied use of external finance due to lack of collateral (Stiglitz and Weiss, 1981).

Even though financial intermediation is said to improve the allocative efficiency of capital, Honohan (2004) argued that finance in rather neutral as it is neither progressive nor regressive to the plight of the poor households. According to Greenwood and Jovanovic (1990), market imperfections prohibit the poor from

participating in intermediary coalitions in the initial stages of development. However, the ability of financial intermediation to ameliorate market imperfections in the long run, converges the income of the rich and the poor reducing relative income inequalities (Greenwood and Jovanovic, 1990). Initial wealth distribution plays a role in determining the long run convergence of the incomes of the rich and poor through participating in financial intermediation services (Banerjee and Newman 1993; Galor and Zeira 1993). Only individuals who have the capacity to borrow can invest in the human and capital investments improving their livelihood concurrently creating income inequalities (Galor and Zeira, 1993). Information asymmetry has credit constraints that are predominantly binding on the poor (see Banerjee and Newman 1993; Galor and Zeira 1993; Aghion and Bolton 1997; Levine 2005). Initially unequal societies maintain this inequality due to market imperfections than the economies that didn't have initial inequalities (Galor and Zeira, 1993). Levine (2005) further argues that that this is the case because the poor do not have the resources to fund their own projects, nor the collateral (nor the political connections) to access most formal market credit. The credit constraints therefore restrict the poor from exploiting investment opportunities, creating income inequalities (Levine, 2005, Beck, Demirgüç-Kunt, and Levine, 2007). Thus countries with higher level of market imperfections also have higher levels of inequality (Galor and Zeira, 1993; Clarke, Zou and Xu, 2003). Barnejee and Newman, 1993; McKinnon (1973) suggest that financial intermediaries can still be beneficial to the poor by offering them profitable savings even if they may fail to offer credit opportunities. These savings opportunities reduce poverty through consumption smoothing and human capital investments (Demirgüç-Kunt and Levine, 2009).

According to Davis and Sanchez-Martinez (2015) information asymmetries worsens the level of poverty among the poor households as the poor have limited access to formal financial services. Financial intermediaries as information providers can alleviate poverty in reducing the information costs and facilitate the access to financial services and products by the poor (Dercon, Bold and Calvo, 2008, Beck, Demirguc-Kunt, Laeven and Levine, 2008). Adverse selection and moral hazard due to information asymmetries are constraints to access to mainly credit and insurance services by small firms and poor individuals (Diamond, 1991). Although Peterson and Rajan (1994) argued that this can be overcome by having relationships with the lender which mainly the poor and the small businesses do not have. This creates income

inequalities between the rich and the poor. Alternatively, lack of information deprives the poor of formal financial services limiting the potential of improved livelihoods as they lack the access to credit and savings to smooth consumption, and risk management options to absorbed unanticipated shock (Claessens and Feijen, 2007; Levine, 2008).

Miller (2015) states that correct information play a crucial role in the financial markets. Intermediaries have an information advantage which they use in creating contracts in the asset transformation process (Hester, 1994). Lack of information creates disequilibrium in the equitable allocation of financial services and products (Doblas-Madrid and Minetti, 2013). The role of financial intermediaries in the financial market faces challenges of accurately screening agents in terms of private information because of the information reliability problem (Ramakrishna and Thakor, 1984; Bhattacharya and Pfleiderer, 1985; Williamson, 1986; Saunders and Allen, 2010). The ability of the financial intermediaries to overcome information problem and offer financial services to the poor enables them to accumulate capital, save and manage their risks.

2.2.2 Transaction costs

The need for financial intermediaries is propelled by the role played by these institutions in solving different informational problems (see Mitchell, 2016: 27). Financial intermediaries therefore reduce the cost of acquiring and processing information thereby improving allocation of resources (Jaffee and Russell, 1976; Keeton, 1979; Stiglitz and Weiss, 1981; Boyd and Prescott, 1986). The ability of financial intermediaries to lower transaction costs promotes specialisation, technological innovation, and growth (Smith, 1776: 9; Levine, 1997). According to Calomiris (1995; 17) in lowering the transaction costs and allowing easy exchange the financial system enables the productive efficiency which spurs economic growth (section 2.6 discusses the links between financial intermediation and growth).

Intermediaries allow consumers to vary their consumption patterns according to the influence of shocks whereby the intermediaries' charges a fee for the service rendered (Diamond and Dybvig, 1983). The presence of information asymmetry can be used by

either households or intermediaries for making strategic decisions (Ramakrishnan and Thakor, 1984). Insignificant imperfections of costly information dramatically changes market outcomes (Stiglitz, 2000). Transaction costs endogenously produce adverse selection and moral hazard that inhibit efficient financial contracting (Becker and Tomes, 1995). Gertler (1988) and Levine (1997) argued that financial intermediaries ease the cost of attaining information and conducting transactions thereby improving allocative efficiency of financial resources.

Formal financial intermediaries have imperfect information on the saving behaviours of the low income and poor people such that they underestimate the provision of such services to this group. Lack of affordable and accessible formal savings channels in the presence of information asymmetry affects the saving behaviour of many low income earners this contributes to income inequalities (Galor and Zeira, 1993, Becker and Tomes, 1986). The financial market consists of agents that have diverse fragments of information, which they use to their benefit (Tirole, 1982; Plaut, 1985; Jaffee and Stiglitz, 1990). Hence the financial intermediaries are able to form information coalitions reducing the cost of information (Brealey, Leland and Pyle, 1977). However, there are possibilities of adverse selection before a transaction is closed and a moral hazard after closing of a transaction in the financial market (Plaut, 1985; Semmler, 2011:35). Opaque information on the characteristics of consumers' profiles often constraints efficient provision of financial products and services (Jappelli and Pagano, 2002; Karlan and Zinman, 2009; Triki and Gajigo, 2014; Asongu, Nwachukwu and Tchamyou, 2016). Financial intermediaries can improve resource allocation by overcoming adverse selection and moral hazards. Alternatively the cost of intermediation especially the credit channel is reflected in the interest rate charged (Shaw, 1973).

Information asymmetries have given rise to the existence of financial intermediaries. However, the same information asymmetries can limit the outreach of financial institutions in the provision of financial services and products to highly opaque clients. Market failure brought by information asymmetries result in financial barriers such as costs, distance of the intermediary and lack of appropriate products. Under economic distress, Rajan and Zingales (2004) argued that the institutions most likely focus on costs that emanates from the free market than the created opportunities denying the

poor household access to intermediary services due to high costs. In this regard, the information asymmetry can result in the distortion of optimal allocation of resources. As the markets are distorted financial intermediaries ration credit and the credit is not easily accessible by consumers with opaque profiles (Stiglitz and Weiss, 1981). The requirement of collateral and documents such as proof of residence sometimes explain the inequalities to access financial services (Aguera, 2015). Situations that are beyond the individuals control such as the free market financial system can cause people to remain in poverty as they fail to access basic services due to market failures (Rajan and Zingales, 2014). However, the financial system is crucial to spread the opportunities that are created by the free markets (capitalism) (Rajan and Zingales, 2014). Thus the free markets are generally accompanied by inequalities (Yaron, Benjamin and Charitonenko, 1998; Pieterse, 2002).

According to Gurley and Shaw (1955) households with balanced income preserve consumption spending, investment, or government goods and services precisely in balance with income. If they save, they invest a like amount, so that their financial assets do not change relative to outstanding debt including equity claims other than earned surplus (Salant, 1939; Gurley and Shaw, 1955). Consumers with surplus funds have an excess of income above what they can spend on good and services. The ability of these households who already have excess funds to save means their saving surpasses their own investment improving their financial position (income) (Gurley and Shaw, 1955). This increase in income more than their liabilities renders them to be suppliers of loanable funds with financial institutions (Stiglitz and Weiss, 1981). Moreover there are consumers with deficit budgets and the financial intermediation allows these individuals spending to exceed income by offering credit at a cost (Shaw, 1973; Stiglitz and Weiss, 1981). In this regard the deficit units' demand for credit enables the financial intermediaries to release loanable fund or issue debt, relative to their liabilities and equity (Gurley and Shaw, 1955). The facilitation of lending and borrowing by financial institutions enables changes in the financial position between surplus units and deficit units (Gurley and Shaw, 1955; Shaw, 1973).

Interest rate is then regarded as the pricing instruments between the surplus and the deficits units of the economy (Shaw, 1973). Real interest rates positively correlated with savings with the financial intermediaries, further propelling the rate of investment

in the economy (Shaw, 1973). The mobilisation of savings by the financial sector propels financial deepening which further facilitates access to credit, with a possible direct effect on the poor individuals (Shaw, 1973). Hence interest rate as a cost of investment can be detrimental to the poor in that

- Capital flight of funds from the financial institutions in search of higher returns limits credit available to the poor household for example lack of the financial resources results in rationing of bank credit (Stiglitz, 1981)
- An artificially low real interest rates facilitates direct financing than intermediated finance which Gurley and Shaw (1955) argued that it retards growth.
- In low interest environments there are tendencies of labour substitution by capital resulting in (unemployment),
- are forced to finance themselves on informal financial markets that are only imperfect substitutes for formal financial markets and more often the informal finance charges higher interests on credit than the formal finance further worsening the plight of the poor.

Thus if lenders lack good information on the borrowers, the contracts are costly to enforce excluding the poor and low income earners from effective use of financial intermediary services. Despite this, the information asymmetry is still crucial for the existence of financial intermediaries. The intermediaries have expertise in managing risks involved in borrowing and lending which individual households may lack. Financial intermediation is then instrumental in poverty reduction in that their ability in resource pooling and diversify risks reduces the cost of risk management for individuals and firms (Stiglitz, 1974; Atkinson and Stiglitz, 1980 and Townsend, 1982). If the financial intermediation process is efficient and vibrant it is able mitigate default risk by having better screening and monitoring of borrowers (Greenwood, 1990 and Bencivenga and Smith, 1991). As the financial intermediaries improve the screening and monitoring activities they are able to increase the issue of credit to borrowers even if they do not have collateral. Poverty is reduced as the low income earners who might not have the collateral to have access to credit are able to access the credit for consumption smoothing, risk management or investment in human capital.

2.2.3 Monitoring

The monitoring ability of financial intermediaries enhances economies of scale by individuals and entities and this improves efficiency and income (Gurley and Shaw, 1955). As an aspect of financial intermediation monitoring with respect to distinguishing good investment project from the bad investment project influence the effect of financial intermediaries on the poor (Schneider and Tornell, 2004; Aghion, Bacchetta and Banerjee, 2004).

2.3. Behavioural Finance Theory

The theory combines psychology and cognitive science in explaining people's irrational and illogical decision on spending, borrowing, saving and investing money (Belsky and Gilovich, 1999). The behavioural finance theory is centred on the pedagogical goal that individuals need to make rational choices but they are restricted by constraints on their ability and resources (Shefrin, 2002; Baker and Nofsinger, 2010). Thus the theory of behavioural finance considers human behaviour in how individuals process information to reach decisions and their preferences (Statman, 1998: 2014). Some choices that people make do not always enhance their welfare and these are driven by behavioural biases such as limited attention or loss aversion (Mullainathan and Shafir, 2009). The structure of financial products affects the decision making of people with respect to bank account ownership as both the person and the situation are functions of human behaviour (Mullainathan and Shafir, 2013)

Tanzi (1998) argues that social norms and attitudes have a strong influence on the income and wealth distribution. According to Levine (1997) the main roles of financial intermediation that as an effect to poverty reduction are

- Savings mobilisation.
- Risk management.
- Facilitation of transactions (payments)

These functional roles of financial intermediaries and how they reduce poverty are further discussed in Chapter 3. Low income earners are typically faced with limited scope for financial blunders, resource scarcity and risk aversion (Loibl, 2018:431).

Self-stereotyping and the habits of the mind affects the adoption and/ acceptance of services in which people previously feel discriminated (Hoff and Walsh, 2018).

Furthermore, behavioural finance is based on irrationality and that psychology plays a role in financial decisions (Shiller, 2003). The theory assumes that the financial markets are informationally inefficient (see Ritter 2003). Additionally, decision making amidst scarcity influence the cognitive and susceptive competencies of individuals (Shah, Mullainathan, and Shafir, 2012; Mani, Mullainathan, Shafir and Zhao, 2013; Haushofer and Fehr, 2014; Asongu and Kodila-Tedika, 2017; Loibl, 2018: 430). The behavioural finance theory opines that households and entrepreneurs exhibit heuristics and biases in their interpretation of financial decision-making choices (Kahneman and Tversky, 1984; Shefrin, 2002; Shiller, 2003; Hoff and Stiglitz, 2016). Stressful situations result in myopic and risk-averse decision-making, conceivably restraining attention and desiring characteristic traits at the expense of goal-directed ones (Haushofer and Fehr, 2014, Thaler, 2016; Hoff and Stiglitz, 2016; Loibl, 2018: 434).

There are challenges in the financial environment in which low-income individuals and families live which influence behaviours and financial choices (Shah et al., 2012; Mani et al., 2013, Haushofer and Fehr, 2014). Instead of being served by mainstream financial intermediaries, low-income neighbourhoods have a larger number of alternative financial services which are mainly informal such as payday lenders, and pawnshops (Barr, 2004; 2012; Mani et al., 2013). This means the poor usually borrow at higher interest rates and this has larger restrictions on the amount of money that can be borrowed (Barr, 2012). This result in constrained liquidity of low-income households compared to those households above the poverty threshold (Haushofer and Fehr, 2014). More often the poor people are preoccupied by circumstances that do not enhance their welfare blurring their cognitive system such that they err in processing useful information to improve their livelihood (Mullainathan and Shafir, 2013). Karlan, Ratan and Zinman (2014) asserts that these behavioural biases are also financial market frictions together with transaction cost and information asymmetry which affect the adoption and usage of formal savings.

This theory can explain the provision of financial products and services by financial intermediaries which is usually based on their business models rather than the financial needs of the larger population. The strategic decisions on what products to offer by financial intermediaries and accepted products by consumers are based on the cognitive biases explained in behavioural finance theory. Most formal financial products and services are designed and distributed under the perception that poor households cannot afford these products. This has resulted in the view that the low-income markets are regarded as a nonessential market for long-term growth by most formal finance entities (Barr, 2004). Misunderstandings on the needs of the majority of the poor end users with regard to financial services have resulted in involuntary exclusion in adoption and use of certain financial products and services.

The strategic decisions are made in an environment with information gaps catapulting the cognitive biases in decision making. The rational decisions by the poor that the trivial available savings is not worth the cost of a savings account with a formal financial institution can explain the non-participation of low income earners. Furthermore the access and use of financial services to an extent depends on the products that suits individual needs. Human behaviours such as trust in certain circumstances have influenced the provision, adoption and use of financial services by different economic units. Hence behavioural traits by financial intermediaries and consumers explain the provision, adoption and use of financial services. There is a common affirmation among behavioural theorists that it is difficult to make good financial decisions when you are poor.

The theories have similarities in that they help to explain how economic units interact. The imperfect information theory explains why financial intermediaries exist and how having information advantage enables the provision of financial services and products. Furthermore, the theory provides an argument on how the information asymmetries can reduce the ineffectiveness of financial intermediaries in allocation of financial resources which leads to the exclusion of poor households in participating in formal financial markets. This limits the capability of the poor as lack of financial capability prohibits effective risk management and consumption smoothing. Low income earners have highly opaque information which explains why they are regarded as high risk because of high cost of delegated monitoring. More often, individuals' financial needs

are misunderstood because less information of their characteristics is available. Institutional and behavioural frictions can sometimes inhibit optimal resource allocation for economic growth which is indirectly is necessary for reducing poverty.

2.4 Theories on the determinants of poverty

According to the World Bank (2005) discrepancies in vital assets such as social capital, human capital and physical assets are correlated with poverty. Understanding the determinants of poverty is crucial for coming up with effective and efficient poverty reduction strategies (FAO, 2018). Poverty is prevalent in areas with inadequate public services, weak infrastructure, poor governance, prone to natural disasters and underdeveloped markets for goods and services among others (White, 2002). Poverty status is determined by various household characteristics which are discussed in section 2.4. Section 2.3.1, and 2.3.2 discusses the theories on the determinants of poverty.

2.4.1 The Culture of poverty theory

In the culture of poverty theory Lewis (1959, 2017) argues that living in poverty generates a way of living that develop into a culture. As the poverty becomes a culture it is then transmitted down to future generations as a trait of a societal collection (Lewis, 1959:150; 1998). This concurs with the Marxist theory of poverty and inequality to be discussed in section 2.4.2 in that poverty can be generational through the environmental opportunities. When this culture has been developed there is low participation in institutions such as banks and hospitals by people living in poverty (Lewis, 1998). That is the poor are generally left out of the mainstream social and economic order. The culture of poverty then perpetuates to be a life cycle as argued by (Rowntree, 1903; Lewis, 1998). In the culture of poverty Lewis (1998) postulates that there are dimensions to poverty namely

- the individual,
- the family
- the slum community and
- the community's relation to society

The culture of poverty theory affirms the behavioural finance theory in section 2.2.2 in that poor people are trapped in some individual characteristics. However, there are situational factors which exonerate this mind-set that the poor have only themselves to blame for living in poverty. Poverty is regarded as situational the poor are confined to poverty because of their state or the environment in which they find themselves in (Rowntree, 1903).

The theory explains the exclusion of the poor people in participating in the economic activity. This relates to this study in explaining the non-participation of poor households in the formal financial sector. The state and the environmental circumstance in which the poor people are exposed to limits their access to essential resources which can change their livelihoods (Lewis, 1998).

2.4.2 Marxian theory

The Marxian or the radical theory of poverty postulates that economic growth alone is inadequate in reducing poverty (Peet, 1975). Marxist theorists suggest that inequality in wealth and income are the major causes of poverty. Poverty thus is a result of a direct inequality that is inherent in a class structure (Kincaid, 1973). Economic and social exclusion of certain group of people prohibits them from effectively realising the welfare benefits of the overall economic growth (Sen, 1983; 1985). This supports the assertions by Adam Smith (1776) for the quest for an inclusive society by stating that

> *"What improves the circumstances of the greater part can never be regarded as inconveniency to the whole. No society can surely be flourishing and happy, of which by far the greater part of the numbers are poor and miserable".*

Implicitly this means substantive economic growth unaccompanied with poverty reducing strategies is not enough for advancing the welfare of the whole economy.
Hence the non-participation of the poor household in the adoption and use of financial products emanates from social exclusion (Sen, 1983). This social exclusion means the poor do not have access and privileges to use certain services and products which are usually available in affluent areas. Financial intermediaries have the capacity for product and geographical outreach to eliminate the exclusion of poor households. Alternatively, poverty is regarded as exogenous separate from the individual

characteristics and it is influenced by the socio-economic environment in which the poor people live (Townsend, 1979).

The capitalist society renders the market dysfunctional such that a class divide due to social and political factors causes' poverty (Rajan and Zinagales, 2004). Despite blaming the capitalist society as the major environment that propels poverty, the Marxists converge with other theorist in that poverty is the lack of material wellbeing.as result of inadequate income (Parthasarathy, 2015). Furthermore under the Marxian theory poverty is not only regarded as an individual factor. Poverty is as a result of uneven distribution of income and wealth (inequality) (Peet, 1975). However, O'Donnell, (1998) disagreed that poverty and inequality are the same as poverty mean insufficiency in material resources whilst inequality is a situation where certain groups in the society have more material resources than others.

However, irrespective of this highlighted disagreement the definition of inequality is not different from the definition of relative poverty (see Chapter 4). Furthermore in the Marxist theory, poverty is regarded as a structural phenomenon due to prejudice, corruption and a stratified labour market (Gans, 1972, Blank, 2010). It is possible for inequality to be generational due to the environmental opportunities and services in which one is born (Peet, 1975). Becker and Tomes (1979, 1986) argue that financial intermediation has the capacity of changing the income distribution across generations by efficiently distributing the economic resources. Furthermore, the utility maximisation of consumption and investment opportunities across generations has affected how the income is distributed in the economy (Schumpeter, 1951; Becker and Tomes, 1986). Loury (1981) reiterated that income correlates positively across generations as the income of parents determines the investment in human capital such as education of their offspring. In this regard the discussion highlights that inequality is presented as the earnings distribution, income and prosperity amongst individuals and families (Becker and Tomes, 1986). This has been blamed on the dysfunctional free financial markets as they lack the efficient distributional; role of resources (Smith, 1776). On the contrary Rajan and Zingales (2004) argues that the reliance of the financial system on political goodwill for its infrastructure has affected the operating efficiency of these institutions especially in the developing nations.

In this regard, there is a social divide such that the rich in the society lacks the motivation to eradicate poverty as this entails changes in the societal income distribution (Peet, 1975, Claessens and Perotti, 2007). Bureaucracies affects how polices are implemented and the effectiveness of such policies in poverty reduction (Deininger, 2003). This explains the importance of institutional quality in effecting lowering poverty and inequality. It is therefore detrimental to promote policies that discourse the indicators of poverty without altering the poverty generating factors (Peet, 1975).

2.5 Determinants of Poverty

Poverty has patterns and causes, briefly described in this section possibly it will help in explaining why some individuals and/ or regions are poor than others. Implicitly finance can be instrumental in tackling some of these poverty determinants (Demirgüç-Kunt and Levine (2009). According to the World Bank (2005), understanding causes of poverty remains a 'missing middle' in poverty studies and this has affected the success of most poverty reduction policy strategies. Stark (2009) argues that how poverty is conceptualised affects how it is defined and the strategies designed to reduce it. This suggests that poverty is complex in definition as well as in the strategies that are designed to alleviate it (World Bank 1990; United Nations, 1995). The World Bank (2005) classifies poverty characteristics as macro, sector-specific, community, household and individual. There are different aspects that correlate to or cause poverty which can be regional (such as natural disasters, governance and property rights among others) (see World Bank, 2005). Alternatively there are also community level/social characteristics as determinants of poverty such as the availability of infrastructure and services (for example roads, water, electricity and health, education, shelter) (Davis and Sanchez-Martinez (2015)).

The other characteristic of poverty determinant can be demographic (gender, age structure and gender of the head of the family). Education attainment has also been regarded as vital as a determinant of poverty. Households whose head of the household has attained a certain level of education are most probably non-poor than their uneducated counterparts (Mukherjee and Benson, 2003; Datt and Jolliffe, 2005; Gounder, 2013; Lekobane and Seleka; 2017. However, Rupasingha and Goetz (2007)

argued that educational attainment not complemented by other factors such as social, political and economic factors is insufficient to lift people out of poverty. Economic determinants of poverty include employment status, hours worked, property owned and the ability of the poor to participate in the formal economy. Poverty reduction strategies therefore aim at changing the circumstance of these poverty characteristics to improve the living standards of the people who are living in poverty (Mukherjee and Benson, 2003). According to Marxian theorists inequality is the major cause of poverty. Addressing the indicators of inequality without changing its elementary causing forces is therefore useless as argued by Peet (1975).

The Food and Agriculture Organisation (FAO, 2018) states that poverty is a socio-economic phenomenon hence the characteristics of poverty are very broad. Dewilde (2008) argued that the institutional arrangements in an economy correlate with the level of poverty. More often institutional settings are affected by the political and the cultural at the neglect of the economic dimensions (Castles, 2000; Dewilde, 2008). Formal financial services that are available to the poor are mainly credit related than savings opportunities (Barr and Sherraden, 2005; 2012; Stegman, 2010). This has limited the capacity of the poor to accumulate wealth for starting-up entrepreneurial ventures, consumption smoothing or for risk management. Economic theories have not been explicit on the direct/indirect financial determinants of poverty (Levine, 2004; Ravillan, 2004; Beck et al., 2008). The financial sector via its effects on economic growth indirectly determines the level of poverty in many developing economies and alternatively the financial sector has direct impact on poverty through the direct access to financial services by the poor.

2.6 Theories that links (GDP per capita and financial intermediation)

Savings and credit are the main channels of financial intermediation which drives the income growth in the economy (Akhter and Daly, 2009). The main theories of financial intermediation and growth/ income growth are hypothesised on the concept of ‘supply leading’ and ‘demand following’ correlation between the financial sector and the economy (Barnejee and Ghosh, 1998). Patrick (1966) argues that as the real sector grows there is an increased demand for the financial sector services inducing growth in the real sector (demand following hypothesis). On the other hand the supply leading

hypothesis theorises that the formation of financial sector increases supply of financial services; this in turn increases growth in the real economy (Patrick, 1966; Bhatt, 1993; King and Levine; 1993; Calderón and Liu, 2003). According to Gurley and Shaw (1955) institutionalisation of savings and debts improves economic growth rather than direct financing which tends to retard economic growth as it is inefficient in directing the resources to the productive sectors of the economy. Beck and Rahman (2006) opined that the efficiency of the financial system has ramification to the growth of the economy. Hence the financial intermediation is crucial as it facilitates the exchange of resources between surplus and deficit units allowing for growth through specialisation and innovation (Levine, 1997; Beck and Levine, 2004).

In lowering transaction costs (discussed in section 2.2.2) the financial system facilitates borrowing for skills accumulation thereby promoting human capital accumulation. Financial systems can also promote the accumulation of human capital by lowering the costs of intertemporal trade, i.e., by facilitating borrowing for the accumulation of skills (De Gregorio 1996). If human capital accumulation is not subject to diminishing returns on a social level, financial arrangements that ease human capital creation help accelerate economic growth. The direct and indirect influence of the financial sector on economic growth has poverty reduce effect (Ravallion, 2005; Levine, 2004). Economic growth is propelled by financial intermediation through capital accumulation and growth productivity (Calderón and Liu, 2003). Goldsmith (1969), McKinnon (1973), Shaw (1973) argued that the financial intermediation is correlated to the rate of capital accumulation per worker through the exogenous factors such as technology, income distribution, institutional arrangements and preferences (Solow, 1956).

The McKinnon (1973) conduit effect focused on the role of saving in creating liquidity in the economy that is for economic growth. On the other hand Shaw (19730 focused on the distributional role of the financial sector in propelling economic growth. In this regard the growth is regarded to be a linear function of capital stock with gross savings equalling gross investment in equilibrium (Pagano, 1993). The ability of financial intermediaries' to collect information and evaluate alternative investment projects and risk sharing which allows individuals and corporates to invest in high yield risky projects has growth inducing effects (Greenwood and Jovanovic, 1990; Pagano,

1993). The efficient allocation of the accumulated savings to productive investments by the intermediation process induces growth which in turn is beneficial to the poor (Levine, 1991; Saint-Paul, 1992). Furthermore, financial intermediation spurs growth by its risk pooling function which reduces preventable termination of investments by economic agents to absorb economic shock (Greenwood and Jovanovic, 1990; Pagano, 1993). However, Devereux and Smith (1994) argue that the insurance opportunities can reduce growth as it discourages precautionary savings by households.

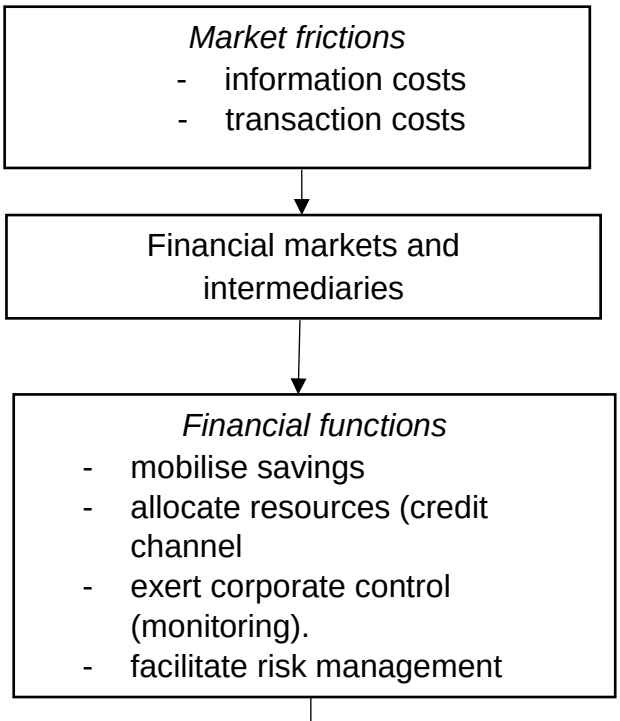
Theory argues that financial intermediaries affect capital accumulation either by varying the savings rate or by differential reallocation of saving among capital producing technologies (Goldsmith, 1969; McKinnon, 1973; Shaw; 1973, Diamond and Dybvig, 1983; Levine, 1997). Sustained economic growth is beefed up by capital investments and savings mobilisation (Rosenstein-Rodan, 1943; Rostow, 1960). However, Seven, and Yetkiner (2016) observe that the effect of financial intermediation on growth depend on the level of income in the economy. In low income countries finance has a role in the growth of the economy whilst it plays no role in high income countries (Seven and Yetkiner, 2016). Information amelioration and the reduction of transaction costs enable financial intermediaries to have an impact of growth (King and Levine, 1993; Bencivenga, Smith and Starr, 1995; Beck and Levine, 2004). McKinnon (1973) argues that the instability of financial intermediaries affects the level of economic growth indirectly affecting the transmission of the growth benefit to the poor people.

This affirms the absolute income hypothesis (AIH) of Keynes (1936) which previously argued that income determines the poverty reducing effect of the financial sector via economic growth. As the level of aggregate income in the economy increases the households sector increases consumption and savings improving their wellbeing (Keynes, 1936; Modigliani, 1949; Modigliani and Brumberg, 1954; Katona, 1975; Nyhus and Pons, 2012; Nyhus, 2018). Modigliani and Brumberg (1954) opines that individual's wellbeing is contingent to attainable consumption, which is reliant on permanent income than to current income. Pagano (1993) argues that for liquidity constrained individuals household consumption is determined by current income rather than permanent income. In his regard the function of financial intermediation

process of credit allocation has an effect to the overall growth in the economy (Levine, 1997).

The ability of financial intermediaries such as banks to create more income from the deposits by issuing credit increases the level of consumption effecting an increase in the wellbeing of the general population. Therefore, the role of financial intermediation and gross domestic product per capita explains mainly the income poverty. Castles (2000) opines that economic growth is necessary but not adequate for welfare improvement. However economic growth provides the households with the needed purchasing power increasing the households' income and consumption (Sen, 1982). Levine (1997), summarised the theoretical framework of the relationship between finance and growth and it's illustrated and summarised in Figure 2.1 below. The financial sector affects economic growth via the functions of finance which channels the financial resources in the economy (Cole and Slade, 1991; Merton and Bodie, 1995). The highlighted functional approach in Figure 2.1 illustrates the value addition role of intermediation to the economy as it leads to economic growth. The ability of the financial system to research firms, managers and individuals, enforce corporate control, and facilitating risk management, exchange and resource mobilization is can act as a catalyst for economic growth.

Figure 2.1: Theoretical approach to finance and growth



Source: Adapted from Levine (1997).

Financial intermediation enhances the improvements in the gross domestic product per capita by enhancing technological progress and capital accumulation (both human and physical capital (Schumpeter, 1911; Diamond and Dybvig, 1983; Beck et al., 2000; Claessens and Feijen, 2007). According to Schumpeter (1961) the ability of financial intermediaries to mobilise savings and transmit capital to innovative ventures stimulates income growth. Diamond and Dybvig (1983) concurred that the banking sectors' primary role is the liquidity provision which facilitates investments in productive assets enhancing efficiency of capital build-up and economic growth. This highlights the primary role of financial intermediation of issuing liabilities using funds solicited from surplus units, and allocates the funds among the deficit units (Greenwood and Jovanovic, 1990).

In arguing the link between GDP per capita and financial intermediation there are two main schools of thought namely the supply leading and the demand following argument. Gurley and Shaw (1955) propose that an income grows with an increase in the demand for money. Asset accumulation and an increase in income by surplus units increase the demand of financial services such that the financial sectors broaden the services and products offered by the financial intermediaries (McKinnon, 1973; Shaw, 1973). Furthermore, demand for financial services and products stimulates competition and more entries in the financial intermediation market improving the services offered by these intermediaries (Becker, 1957; Merton, *1995*; Claessens, *2009*) According to Becker (1957) the availability of intermediated finance enhances

competition in the real sector by reducing entry barriers by new firms. This competition results in the availability of expanded opportunities for the previously disadvantaged in the form of labour or funds available for entrepreneurial activities (Kpodar and Singh, 2011) Gurley and Shaw (1955) reiterate that the equilibrium of income per capita is determined by financial institutions and usage of financial products, that is the quantity of money is reliant on the extend of intermediation.

The income growth of any economy is said to be slow if only direct finance and self-finance are available without financial intermediation (Gurley and Shaw, 1955; Beck et al., 2000). Arguably this implies that financial intermediaries drives the income, however the distribution of that income can be skewed resulting in inequalities. Rousseau and Wachtel (1998), opines that financial intermediation leads output which do not directly feed back into financial intermediation. Although growth is necessary for poverty reduction it is not sufficient (Jalilian and Kirkpatrick, 2002; Dollar and Kraay, 2002; Beck et al., 2004). Kuznets (1955) argues that the effect of the financial sector in the distribution of income appears to happen in phases, such that in early phases growth increases with an increase in inequality. This however gets to a maximum threshold where per capita income increases with a decrease in equality (Kuznets, 1955; Paukert, 1973; Lindert and Williamson; 1985; Greenwood and Jovanovic, 1990,). There are arguments that state that institutional structures or frameworks are essential for an effective influence of finance to economic growth (see Cole, Mailath and Postlewaite, 1992; Kirkpatrick, Sirageldin and Aftab, 2000).

2.7 Crowding out effect theory

Under the crowding out effect theory the channels of influence of the public sector debt to the private sector investments are discussed. Buiter (1977) defines crowding out as when the sovereign (government) economic activity displaces the economic activity of the private sector. The crowding out effect that is of interest in this study is the financial crowding out, this occurs when debt financing in the financial markets by the public sector inhibits private capital formation due to shortage of capital in the financial market (see Munduch, 1991 for a discussion of dimensions of crowding out). As the government taps into the domestic savings there are reduced loanable funds in the

debt market pool resulting in higher costs of capital for private borrowers (Diamond, 1965, Barro, 1974). Furthermore, the interest payments on domestic debt absorbs government revenue that could have been otherwise used on pro poor , reducing private investment demand, and hence capital accumulation, growth and welfare (IMF, 2018). Domestic debt supported government spending crowds out the private capital formation as the demand for investments is interest elastic (Friedman, 1970; Carlson and Spencer, 1975). However, Keynes (1936) says crowding out is only stronger if the economy is close to full capacity.

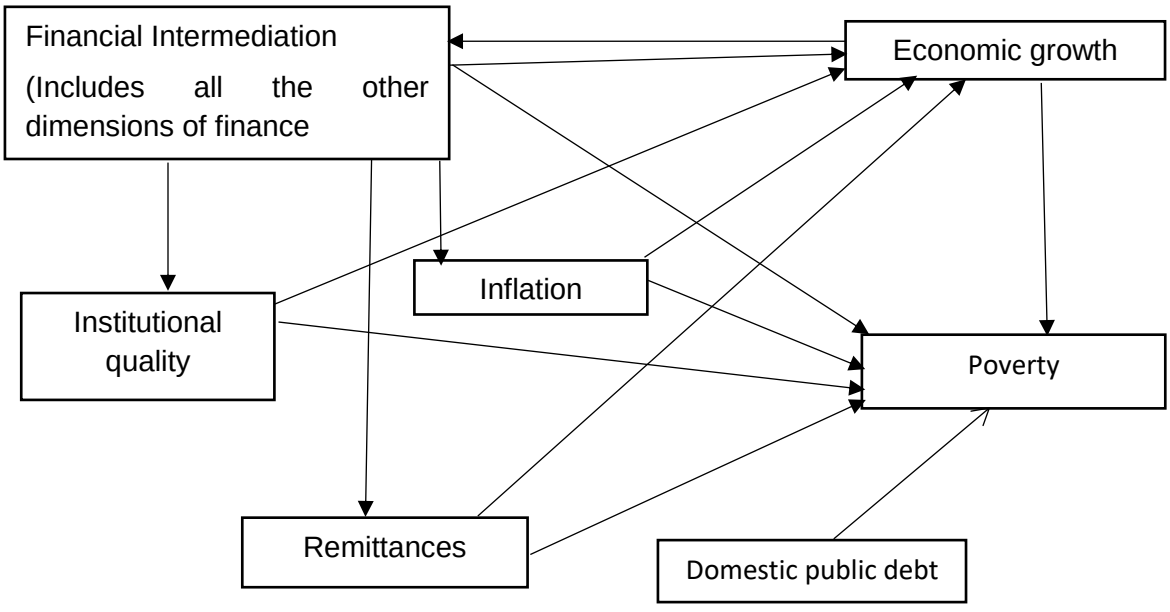
2.8 Conceptual framework

According to Jeanneney and Kpodar (2011), the role of finance in poverty reduction can be direct through the distributional effect of financial intermediaries or indirectly via economic growth. In theory the role of finance in poverty reduction is mainly captured as a trickledown effect via economic growth rather than a direct effect (Aghion and Bolton, 1997). The role of finance in in the real economy advances capital accumulation and human development which in turn fosters economic growth (Greenwood and Jovanovic, 1990). The economic growth is then transferred to the population where the poor people can also benefit from improved livelihood through raising the incomes of the poor (OECD, 2006). This was further supported by Beck et al. (2009), Giné and Townsend (2004) and Townsend and Ueda (2006) who noted that the benefits of financial intermediaries cannot only be ascertained by the use on financial services by the poor. There are feedback loops in the financial sector and the real sector in that as financial markets deepen, the economy grows increasing the labour demand and creating job opportunities for the poor (Beck et al. 2009; Giné and Townsend 2004; Townsend and Ueda, 2006; Kpodar and Singh, 2011). As the incomes of the poor improves they are able to pay for goods and services that improves their education and health which in turn has a multiplier effect on their wellbeing (Glewwe and Jacoby, 2004; OECD, 2006). However, growth is necessary but not sufficient condition for poverty reduction (Soubbotina, 2004; OECD; 2006). Hausmann, Rodrik and Velasco (2006) identify financial intermediation as a necessary condition for effective performance of economic growth in sufficiently distributing the benefits of economic growth. In some countries growth is achieved at the expense of

high income inequalities; overconsumption of natural resources more often it is not sustainable growth (Soubbotina, 2004).

For finance to be effective in poverty reduction access to the services of financial intermediaries by the poor are a prerequisite (Scholtens, 2003). Finance is more beneficial if the poor have access to other financial services such as savings and insurance other than only credit (see Pande et al., 2012; Demirgüç-Kunt et al., 2008; Kast and Pomeranz, 2014; Karlan et al., 2014). Figure 2.2 below gives a summary of the conceptual framework of the study. As has been discussed in the literature the effect of financial intermediation to poverty reduction can either be direct or indirect via economic growth. The role of other variables such as inflation, institutions and remittances cannot be ignored in fostering the effectiveness of financial intermediation in poverty reduction. These variables are discussed in detail in the empirical literature on how each of the variables affects poverty. Figure 2.2 summarises the conceptual framework for this study

Figure 2.2: Summary of the conceptual framework



Source: Authors

2.9 Chapter Summary

In summation, this chapter has discussed the theories for this study. The imperfect information theory explains the existence of financial intermediaries centred on information asymmetries in the financial market. The chapter elucidates that information asymmetries gave rise to the need of financial intermediation. Alternatively, the presence of information asymmetries results in the inadequacy of financial intermediaries in adequately evaluating the economic agents leading to access constraints where other economic agents have access to the products and services offered by financial intermediaries. This worsens the level of poverty as the poor households lack the capacity to participate in the financial sector in capital accumulation, credit and payments which improves their poverty incidences.

However, the ability of financial intermediation to ameliorate the effects of imperfect markets by reducing information asymmetry, reducing transaction cost and delegated monitoring allows the participation of the previously disadvantaged groups. As the poor participate in the intermediary services they are able to alleviate their poverty as they are able to save, smoothen consumption and manage their risks. The behavioural finance theory on the other hand illuminates how economic agents have biases in their financial decision making. The issue of trust which is further enforced by the role of institutions are the behavioural biases that exist in formal financial intermediation and the adoption and use of the services of these intermediaries. As there is no single theory that adequately explains the role intermediation in poverty reduction all the theories discussed in this chapter are considered in determining the relationship between poverty and financial intermediation. The theories discussed augment each other in that as imperfect markets exist the behaviour of the economic agents in responding to its effects plays a role in provision and use of the financial services.

The decision making of economic agents is influenced by their behavioural connotations. The participation of the central government in the financial market can lead to an increase in interest rates which in return crowds out private sector

investment constraining private sector investments and the credit availability in the market. Furthermore, the crowding out can further result in credit rationing constraining the access of credit by the poor households and firms. This rationing of credit can further dampen income inequalities. Poverty has been classified as complex hence no single theory can fully account for the determinants of poverty. Poverty is persistence and this can the culture of poverty captures this as it outlines that poverty can be generational as lack of finance by parents can subsequently determine the capital accumulation and the investments in education, health and risk management. The reviewed theories are not exhaustive on all the determinants and poverty dynamics but it is assumed that the major theories discussed above form the basis of the conceptual framework of the study. The mixing of different theories in the study gives the study a wider, deeper and panoptic view of the subject under investigation.

CHAPTER 3

EMPIRICAL LITERATURE REVIEW

3 Introduction

The present chapter undertakes a critical engagement with the theoretical literature related to the study. Notably, there are multiple previous studies that have examined, as part of their objectives, the role of financial intermediation in poverty reduction which is the subject of this study. In this study the financial intermediation is regarded as a dimension of financial development. Financial intermediaries are able to reduce poverty through the functions of financial intermediation which will be extensively discussed in this chapter. The discussion on the financial products and services covers all intermediation aspects such as transaction, credit, payments, savings and risk management. Section 3.1 discusses the landscape of financial intermediation in developing countries. By reviewing the relevant literature and examining postulations of other scholars on the subject, this chapter locates this study as a contribution amongst the contributions of other experts in the discipline.

3.1 Definition of key variables

3.1.1 Poverty

The World Bank Report (2000) defined poverty as the unacceptable physiological and social deprivation in human wellbeing consisting of low incomes and the incapacity to attain the basic goods and services essential for survival with dignity. The bank further asserted that poverty also includes low levels of health and education, poor access to clean water and sanitation, insufficient physical safety, dearth of voice, and inadequate ability and prospects to improve one's life (World Bank, 2000). Alternatively, the United Nations (UN) (1998) noted that:

> "*Poverty is a denial of choices and opportunities, a violation of human dignity. It means lack of basic capacity to participate effectively in society. It means not having enough to feed and clothe a family, not having a school or clinic to go*

to, not having the land on which to grow one's food or a job to earn one's living, not having access to credit. It means insecurity, powerlessness and exclusion of individuals, households and communities. It means susceptibility to violence, and it often implies living on marginal or fragile environments, without access to clean water or sanitation".

The headcount ratio is used as a proxy for poverty. According to the World Bank (2000) headcount ratio is defined as the share of the population with income below the national poverty line. This is the definition that has been accepted in the SDGs. The World Bank reiterated that poverty lines are anchored to the cost of a food bundle based on the predominant general diet of the poor. The World Bank definition of poverty will be adopted for this study as used in other previous studies (see Beck, 2007; Rewilak, 2017). Poverty is multidimensional and it has broad definitions and measurements, Drewnowski (1977) argued that meaning and measurement of poverty is significant only when it is embraced as a background for policy action. Chapter 5 further discusses on the measurement of poverty. Since the study is a panel study the World Bank (2000) definition of poverty is adopted to make it easy for the uniformity on the definition of poverty across countries and analyse the data for the countries that are covered in the study.

3.1.2 Financial Intermediation

Financial intermediation is a productive activity in which an institutional unit acquires financial assets by engaging in financial transactions on the market and incurs liabilities on its own account (OECD, 2007). In this study the ratio of private credit to GDP will be used as a proxy for financial intermediation (see Rother, 1999; Levine, et al., 2000; Beck and Levine, 2004, Naceur Blotevogel, Fischer and Shi, 2017). Private credit is a preferred measure for this study since it is the closest measure to the definition of financial intermediation (see Levine, 2008; Beck, Colciago and Pfajfar, 2014; Rewilak, 2017). In other studies the financial intermediation has been measured by the ratio of money to gross domestic product (see Jeanneney and Kpodar, 2011; King and Levine, 2012, Sehrawat and Giri, 2016; Cepparulo, Cuestas and Intartaglia, 2017; Naceur et al., 2017). It is important to note that most of these studies in the finance poverty nexus sphere focused on financial development whilst in this study the

focus is on financial intermediation which is regarded as a component of financial development. A panel cointegration approach has been conducive given the context of their studies. n the conxet of our study the ratio of private credit to GDP is the closest measure that reflects financial intermediation. Furthermore, the objectives of the study guid the choice of the credit based measure as it is the closest measure to the functions of financial intermediation (King and Levine,1992) as the ratio of money to gross domestic product do not capture the use of the bank generated financial resources (see Rother, 1999).

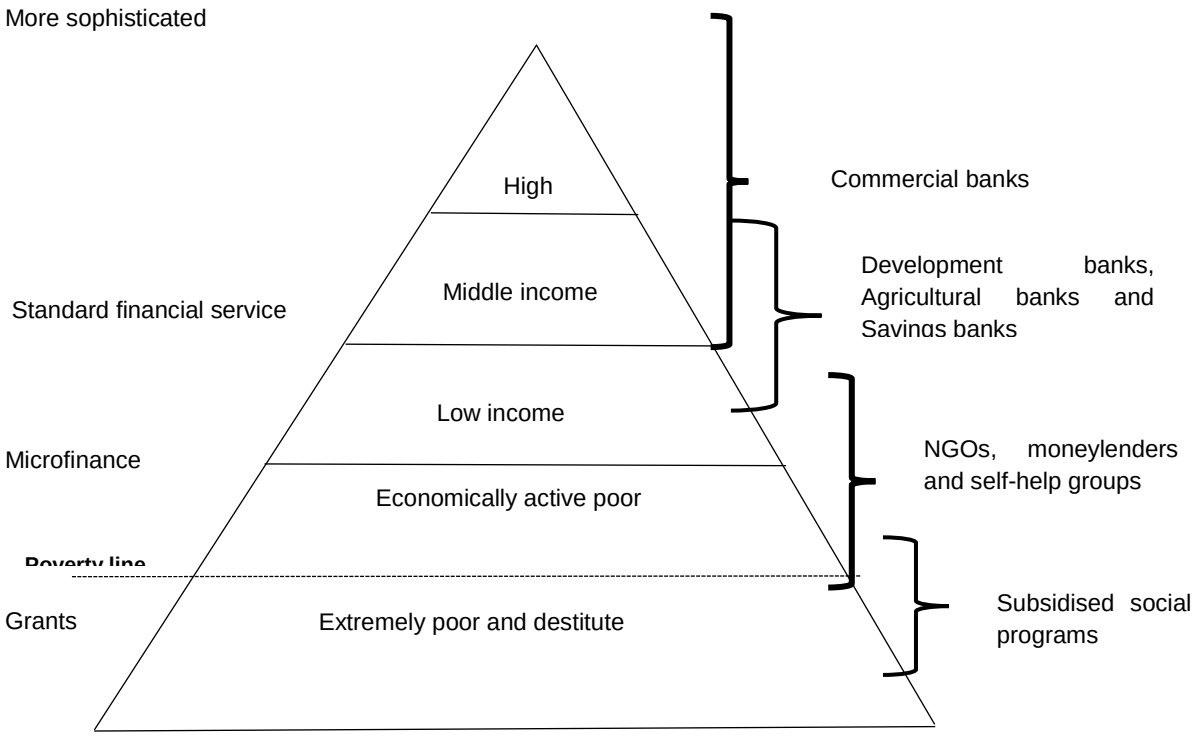
3.2 Financial intermediation landscape in developing countries

Access and use of formal financial services is argued to offer more benefits in terms of savings, investments, payments and risk management than the non-formal sector (Aguera, 2015). In most developing economies the provision of financial services to low income and poor households is rarely by the formal financial intermediaries. Figure 3.1 summarises the provision of financial services and products in developing countries. The low-income household and the poor in developing countries are mainly served by Alternative Financial Institutions (AFI) as illustrated in Figure 3.1.

The financial providers at the bottom of the pyramid (BoP hereafter) seek mainly financial and social returns, rather than profit maximisation, which is the main goal of formal financial intermediaries (Rabobank, 2005; CGAP, 2004). The BoP describes a consumer profile, and the financial products and services accessed by this consumer profile (Chapman and Mazer, 2013). According to the CGAP (2018) the financial services and products provided at the BoP are comparatively costly or rigid. Susceptibilities such as low or variable incomes, lower levels of financial literacy and capability, and limited access to or experience with formal financial services characterises this consumer profile (Rajan and Zingales, 1996; Karlan, Ratan and Zinman, 2014; Sundaram and Sriram, 2016; Chandwani and Kulkarni, 2018). More often than not lower education levels, illiteracy, language variances, minority racial or ethnic status, and longer distances from main population centres correlates with the lack of access and use of formal finance by this consumer profile (Chapman and Mazer, 2013). Honohan (2008) postulated that the contribution of formal finance to

poverty reduction is not based in the number of financial assets held by the poor but on whether they have access to the financial products and services.

Figure 3.1: Financial intermediation landscape in developing and emerging markets



Source: adapted from (Rabobank, 2005

Fig 3.1 illustrates the nonexistence of formal bank financial intermediation at the bottom of the pyramid. The BoP is characterised by large numbers of vulnerable customers with limited financial resources and frequent small transactions (Hannig and Jansen, 2010). As a result, they are regarded as high risk by formal financial intermediaries leading to involuntary exclusion from using the services of formal financial products and services (Rabobank, 2005; Demirguç-Kunt, Beck, and Honohan 2008). According to Demirgüç-Kunt, et al. (2008) involuntary exclusion refers to the people who are rejected by the financial system because they are regarded as high risk or their projects are regarded as poor projects. Furthermore, there are price and non-price barriers for the adoption and use of the financial services, sub-section 3.4.1 discusses this further (Beck, Demirgüç-Kunt and Martinez-Peria, 2008, Arestis and Caner, 2005; 2009; Demirgüç-Kunt and Klapper, 2013).

The financial markets also determine how the poor people raise external capital to initiate projects (King and Levine, 1993). The poor are limited on the knowhow to use the financial instruments that are available and in some cases these limitations affects intergenerational poverty (Demirgüç-Kunt et al., 2008). Besides the allocative efficiency of resources finance, also influences the comparative opportunities that are available to individuals (Demirgüç-Kunt et al., 2008, Claessens, 2006). Earlier studies on the role of financial intermediation in poverty reduction focused mainly on the aspect of financial depth without looking at the other dimensions of financial intermediation (see Odhiambo, 2009; Jauch and Watzka, 2016). Demirgüç-Kunt et al. (2008) opined that it is possible to have deep financial markets without delivering access for all. In this regard access to financial services in most previous studies was not regarded as a different dimension mostly because of lack of data. This has been captured as a different dimension in this study as there are improvements in the available data on access. The ability of financial intermediaries to allow people to smooth their income, insure against risks, and broaden investment opportunities by performing different functions (discussed in subsection 3.3.1-3.3.4) has poverty reducing effects (Claessens, 2006).

Better developed financial systems have the capacity to reduce poverty and inequality by efficiently allocating resources (Clarke, Xu, and Zou, 2003). However as previously highlighted the previous studies have focused of the financial development which incorporates the overall financial system. According to Demirgüç-Kunt et al. (2008) most of the private credit in the developing economies is from the banking sector. However, in most developing economies finance from the banking sector and the financial markets caters mainly affluent areas with large enterprise and wealthy individuals (see Beck et al., 2004; Claessens, 2006). This suggests that the distribution of the financial services has been largely skewed without providing the welfare benefits of equitable distribution of income.

This skewed distribution of finance result in allocative efficiencies of finance which is based on connections and nonmarket criteria which in turn act as an entry barrier to the poor households (see Rajan and Zingales 2003, Claessens, 2006). For example, Claessens (2006) argued that credit facilities in formal financial services in developing countries are mainly based on relationships and connections which are mainly political

connections.Morduch (1999) argues that the financial services should be reliable (available when needed); convenient (easy access); continuity (can finance be accessed repeatedly) and flexible (is the product tailored to individual). These dimensions are usually lacking for the poor households with regard to the formal financial services that are available. Claessens and Perrotti (2007) argue that the depth of the financial sector do not equal access to the financial services.

This suggest that the formal financial intermediaries can do more to a more inclusive finance for poverty reduction by structuring their products to accommodate the BoP with respect to credit, savings, payments and risk management. As discussed in the theoretical review and in the subsequent sections of this chapter formal intermediaries still regard the poor market as high risk for full participation of these intermediaries in the neighbourhoods where poor people live. As has been argued by Prahalad (2010), inclusive formal finance is not only beneficial for poverty reduction, but the banks can also benefit profitably in treating the poor as a market. It was asserted that innovation is key in order to achieve the benefits of capturing the BoP market (Prahalad, 2010). The major drawback of the formal financial intermediaries in servicing the poor is to enter the poor's market with already developed products and services which were developed for the affluent (Prahalad, 2010; Karnani, 2009). Mainly the BoP market has low margins and high volumes which most formal financial intermediaries aren't capturing as it is argued that the smaller transaction is expensive.

In servicing the poor markets India is among the success stories as the Bank of India ruled that for every bank licence for an already served market a formal financial institution need to open four branches in unserved areas (see Burgess and Pande, 2005). Furthermore, all post offices opened ATMs so the rural population can have access to the formal banking services. This did not only improve the outreach of banks but it also helped in poverty reduction as the rural poor were integrated to the formal financial services. This finding was further supported by Allen et al. (2013) in Kenya where it was asserted that the expansion of commercial banks in previously underserved area improved the access to formal finance by the underprivileged. Not only innovations in products and processes of servicing the poor is essential but the distribution systems that enhances the outreach of this market is equally essential (Prahalad, 2010; Shukla and Bairiganjan, 2011). It is argued that private companies

(in our case banks) can still be profitable and help in poverty reduction by servicing the poor (Pitta, Guesalaga, and Marshall, 2008; Karnani, 2009).

An examination of the importance of access to formal finance by Honohan (2007) revealed conflicting results on the significance of access to reducing poverty and income inequality. The significance was contingent on the model specification that is access was significant when financial depth was used in the model and the same could not hold with per capita income and dummy variables were included in the equation. However, the access measure that Honohan (2008) used was based on cross sectional data and did not consider the time dimension. Furthermore, the BoP population do not have adequate transactional services in the formal financial intermediaries of which these transactional accounts are very important for domestic and international remittances (Honohan, 2008, Inoue, 2018). Efficient financial management includes both deposits and loans and access to such paths of financial services are said to lower poverty and inequality (see Honohan, 2008, Allen, Demirguc-Kunt, Klapper and Peria, 2016). Ratha (2003) argues that remittances have a potential of bringing new customers to the formal financial institutions by increasing demand for deposits, loans and insurance services.

3.3 Financial intermediation and its functions

The debate on the role of financial intermediaries, especially banks, dates back to the 18th century. Hamilton (1781) in Hammond (1991:36), stated that banks were the greatest engines ever invented to drive the economy. However, this is refuted by Adams (1819) in Hammond (1991:36), who argues that banks harm the “morality, tranquillity, and even wealth” of nations. Hence the role and relationship between finance and poverty reduction has remained an on-going debate (Al-Hussainy, Beck, Demirgüç-Kunt and Zia, 2008; Nanziri, 2016). In addition, Jeanneney and Kpodar (2011) suggest that the contribution of finance in poverty reduction is contingent to the transmission channel. Financial sector development does not necessarily mean increased intermediation. For example, Beck, Cull and Jerome (2005) stated that financial development of the Nigerian economy in the 1980s resulted in financial disintermediation. In this regard, the role of financial intermediation on poverty reduction should not be viewed as a one size fits all.

The financial intermediation role to poverty reduction has been studied albeit mainly as a trickle-down effect via economic growth (see Alexiou, Vogiazas, and Nellis, 2018; Uddin et al. 2014; Inoue and Hamori, 2012; Jeanneney and Kpodar, 2011; Odhiambo, 2010; 2009; Beck et al., 2007a; Quartey, 2005; Dollar and Kraay, 2002; Ravallion and Datt 2002; Jalilian and Kirkpatrick, 2002; Schumpeter, 1934). Most of these studies have focused on country specific studies. Although there is growing research in the role of financial intermediation in poverty reduction the results have been mixed and based on the methodology used for the study. Mishkin (2009) claims that efficient financial system brought about by globalisation is beneficial to the poor. The lack of access and use of basic financial services lowers welfare and hinders poverty alleviation (Guide and Pattillo, 2006). According to Beck, Demirgüç-Kunt, and Levine (2004) measures of poverty and inequality are lower in countries with well-developed financial intermediaries. Against this backdrop, the functions of financial intermediaries are discussed in sub sections.

3.3.1 Easing the exchange of goods and services (payments)

Facilitating payments has been an important function of financial intermediaries in poverty reduction (Pande et al., 2012). The ability to offer remittance services has enabled the poor to transfer their financial resources to their family's intensively contributing to consumption smoothing and risk management to the recipient family members (Ashraf, 2009). Reliable and low transaction payment systems can increase the flow of remittances and ease the exchange of good and services which is useful for the income generating activities. The payments systems enabled by the intermediation process leads to economic growth (Rother, 1999). The trickle-down effect of financial intermediation via economic growth has a poverty reducing effect when the benefits of economic growth are distributed such that the poor people access the benefits of growth. (King and Levine, 1993; Rother, 1999 and Levine, 2005).

3.3.2 Pooling savings from a large number of investors (savings)

The saving facilities allow individuals to use today's money to finance tomorrows' activities (Pande et al., 2012). This is essentially beneficial to the poor if they are

allowed to access savings opportunities with formal financial intermediaries this is essential for consumption smoothing, risk management and capital accumulation which can be reinvested in entrepreneurial activities (Prina, 2015). This function enables the intermediaries to be liquidity creators in which they can lend to the poor who are mostly illiquid constrained (Jack and Suri, 2014). Furthermore, allowing the poor to formally save enables the financial intermediaries to produce information of the savings habits of the further poor facilitating access to credit opportunities (Aportela, 1999; Jayachandran, 2006; Dupas and Robinson, 2013; Dupas, Karlan, Robinson and Ubfal, 2018). If these credit opportunities are eventually accessed they can increase the future incomes of the poor through investments in entrepreneurial projects, education or healthcare. (Rother 1999; Aportela, 1999; Pande et al., 2012). Alternatively, Prina (2015) observed that savings account enables better management of resources by the poor households to manage and their expenditure categories changed. Most people in poverty are subjected to sharp but short lived changes in their financial resources (Carvalho, Meier and Wang, 2016a). However, the poor usually have small savings transactions which are regarded as having lower margin by formal financial institutions (Carvalho, Prina and Sydnor, 2016b).

Economic theory suggests that the intertemporal substitution of resources that is facilitated by the formal financial intermediaries can increase the incomes of the poor if the poor have access to these services (González Vega, 1994; Fernando, 2007). The intertemporal choices are decisions that have consequences in multiple time periods (Lawrance 1991; Carvalho, et al., 2016b). The culture of poverty explained in theoretical literature can have an influence on how the poor people make financial decisions which can affects their poverty state over time (Claessens and Feijen, 2007; Carvalho, et al., 2016a) argued that financial access by the poor improves the consumption levels of the poor households. In the absence of financial intermediation, the households need to accumulate cash holdings before undertaking any investments (Jeanneney and Kpodar, 2011). If intermediaries have larger shares of pooled resources it means the deposited money as savings will be redirected as loans to the borrowers (Rother, 1999).

3.3.3 Allocating society's savings to its most productive use (credit)

According to Merton (1995) the financial intermediaries facilitates the allocation of economic resources through time and across geographic regions and industries. This explains the capacity of the financial intermediaries in credit extension to the most productive sectors of the economy (World Bank, 2018). For the poor to insulate themselves to economic shocks borrowing is necessary. However, in formal financial intermediaries credits extension is usually constrained as the small transactions are regarded as costly (Jeanneney and Kpodar, 2011). Although the poor can benefit from this function of finance it is argued that their smaller transactions requires higher unit costs and has resulted in borrowing constraint for the poor households (Banerjee and Newman, 1993; Aghion and Bolton, 1997). Deeper financial markets can be able to bear higher unit costs of smaller transactions thereby affording the poor to have access to credit (Rajan and Zingales, 2003).

3.3.4 Diversifying and reducing liquidity and intertemporal risk (insurance)

Unlike individuals and informal finance, formal financial intermediaries have better expertise with regard to risk management (Bajun, 2009; Pande et al., 2012). Formal financial intermediaries have the capacity to smooth individual risks due to their ability for credit extension to many projects, thereby enabling the formal intermediaries to offer loans at favourable rates than those of the informal sector (see Merton, 1995, Rother, 1999; Levine, 2005; Bajun, 2009; Turner, 2010, Pande et al., 2012). Furthermore, Carvalho et al. (2016a) argued that there are feedback loops to poor families as access to formal savings devices increases the desire of the poor to delay gratification as they take more risks.

These discussed functions of finance highlight that the functional perspective of formal finance has a capacity to increase the incomes of the poor if they are made accessible thereby lowering poverty in the poor communities. The access and use of formal finance can potentially increase the incomes of the poor people if they ultimately have access to the functions of finance which described in sections 3.3.1-3.3.4 above (see Pande et al.' 2012). Merton (1995) opines that the functions of financial intermediaries are fairly stable overtime and across borders however, it is how they are performed that has substantially changed. Given these functions, the intermediary institutions'

operations are motivated by profit hence provision of financial services that is not profitable can lead to financial crisis and/ bankruptcy (Boston Consulting Group (BCG), 2017).

Furthermore, the high costs of delegated monitoring by formal intermediaries have involuntarily excluded the poor and low-income household from using formal financial services (Allen et al., 2013). In most cases the costs of using financial intermediary products and services are so high that there is no net benefit of using such services (Schumpeter, 1939; Diamond, 1984). Aguera (2015) argues that sustainable finance should not be finance for all at all cost, but it should be viable and safe. In the same argument, it is stated that finance should be affordable for the consumer, sustainable/profitable for intermediary and should not threaten consumer protection or stability (Aguera, 2015). Given that the formal intermediaries operate on profit making business model, therefore, they have a very limited number of products that cater for the poor. Thus in most developing economies penetration of formal banking products and services at the base of the pyramid (see Fig 2.1) is very low (Realini and Mehta, 2015).

3.4 Opportunities and Challenges in formal intermediation

Sub-section 3.4.1 to 3.4.5 discusses a review of opportunities and or challenges in the provision of formal financial services. Section 3.4.1 discusses the access and use barriers of formal financial services. The geographic barrier of financial intermediation is discussed in section 3.4.2 as the distance to the intermediary can affect the decision to use certain financial products and services. Most financial formal financial intermediaries require collateral for credit extension, Furthermore the requirements of documents such as proof of address and identification documents prohibits the poor from accessing financial services and this is discussed in section 3.4.3.

3.4.1 Barriers to access and use of formal financial services

Access to formal financial services by the poor remains a challenge in most developing and emerging markets (Beck and Demirgüç-Kunt, 2008). There are price and non-price barriers that have resulted in the involuntary exclusion of mainly the poor and the disadvantaged households from the access and use of financial services (see Arestis

and Caner, 2005; 2009; Beck, Demirgüç-Kunt and Peria, 2007; Demirgüç-Kunt and Klapper, 2013). According to Greenwood and Jovanovic (1990) the initial set-up cost required by the formal financial providers discourages the use of financial services by the poor.

The Global Findex (2017) database cited a number of reasons of barriers to financial services with high cost, physical distance, and lack of proper documentation among the reasons of exclusion from the use and access of financial services. These barriers have remained the challenge for the poor and low-income households to equitably access and use the financial products and services (Beck, 2007; 2014; Aguera, 2015). Sahn, Younger and Genicot (2003) argues that as distance and time to the financial intermediary increases, demand for the services of formal finance decreases in favour of informal finance which are usually located closer to the communities of the poor people. Furthermore, the better outreach by financial intermediaries increases the adoption and use of financial services (Beck, et al., 2007b, Claessens, 2006). This was further supported by Filipiak (2016) that physical proximity positively affects trust of financial intermediaries by households with their money. As previously asserted by Stiglitz and Weiss (1981), and Stiglitz (1998) argue that market imperfections result in unequal access to credit by people who do not have adequate wealth for collateral.

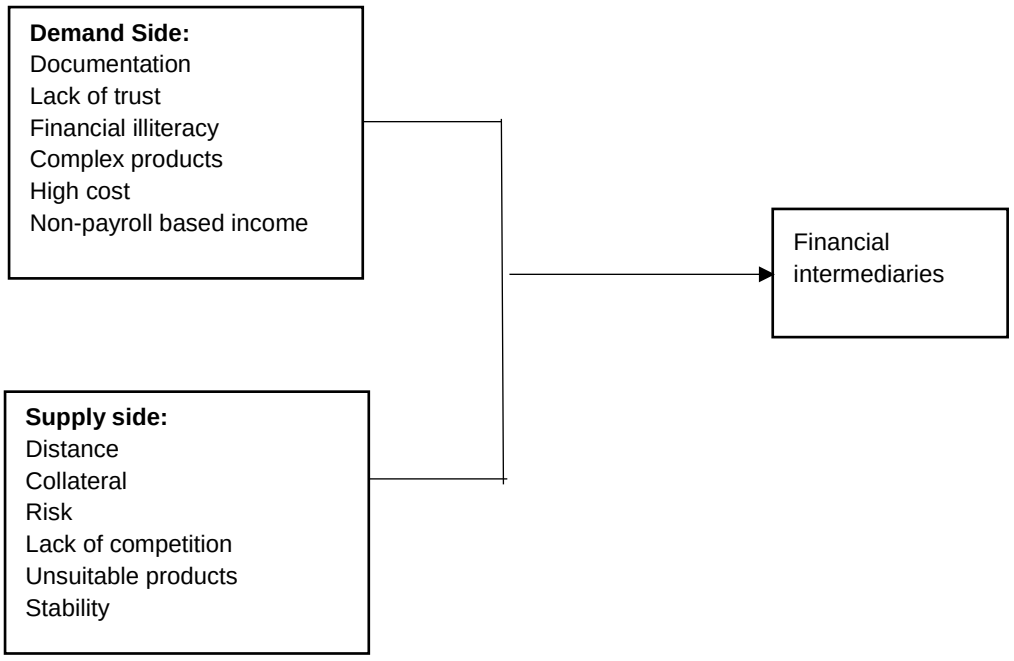
This was supported by Aguera (2015) who noted that market imperfections result in involuntary exclusion from the use of financial products by the poor. Chigumira and Masiyandima (2003) reiterated by stating that formal financial institutions lack a lending criteria that is appropriate for micro-borrowers. Furthermore, Rau (2004) stipulated that the formal financial services have inappropriate products because they fail to distinguish between liquidity and credit needs among the poor. In support of this view, the World Bank (2013) opines that in most transition economies the formal credit opportunities are mainly based on payroll lending. This payroll based lending has kept most of the poor out from using formal financial services and products). Furthermore, formal banking is associated with non-monetary costs which are assumed to be large enough to discourage the use of formal savings services by the poor (Barr, 2004; Karlan et al., 2014). This has left the microfinance institutions, government, non-governmental organisations (NGOs) to cater for the financial products needs of the poor (Littlefield and Rosenberg, 2004). However, most of these organisations lack the

capacity and resources that are found in the formal banking systems (Rau, 2004). The financial intermediation process should therefore bridge the gap in access barriers to extend the reach of formal services by poor households (Chandwani and Kulkarni, 2018).

Access to intermediation services by households and micro firms allows for better consumption smoothing improving their living standards (Jeanneney and Kpodar, 2011; Beck, Büyükkarabacak, Rioja and Valev, 2012). Informal risk-sharing provides only limited protection hence the poor are left vulnerable to extreme negative shocks and poverty (Dercon, 2002). Traditional financial intermediaries have been viewed as only to serve the needs of the affluent thereby marginalising the majority of the people at the BoP (Realini and Mehta, 2015). The SDGs advocates for the need to build resilience to household living in extreme poverty of which the majority of them are in SSA (United Nations, 2017a, b).

Figure 3.2 below gives a summary of demand and supply side factors that are challenges to access and use of formal financial services by mainly low income earners and the poor households. The access and use of financial services can result in voluntary and involuntary exclusion (see Beck et al., 2007).

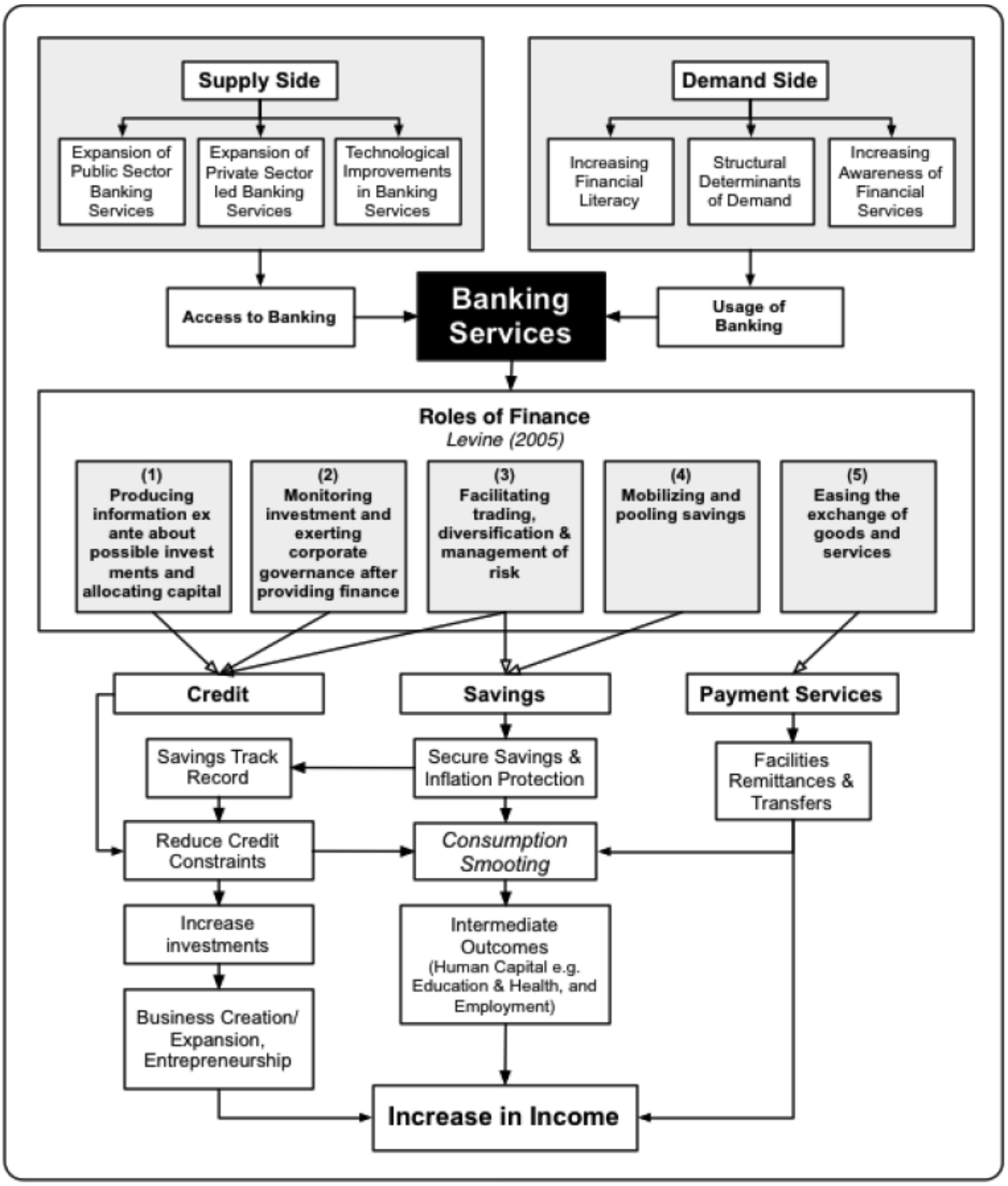
Figure 3.2: Summary of the challenges of using formal financial intermediaries.



Source: Adapted from World Bank, 2013

Linking these demand and supply side factors with the functions of financial intermediation Figure 3.3 by (Pande, Cole, Sivasankaran, Bastian and Durlacher, 2012) explains how access to the formal financial system can increase the poor's income. However, having the formal financial services in the financial systems do not necessarily mean efficiency in the use and access of such services by poor people (Levine, 2005; Barr, Kumar and Litan, 2007; Banerjee and Mullainathan, 2010; Pande et al., 2012). The access of the financial service in enables by the proximity of services providers to the larger population. Furthermore, the take-up of the financial services and products the larger population need to be aware of the services and they have to suit their needs. The functions of finance as illustrated in Figure 3.3 inevitably accord the savings, payments and credit services to the households and firms (Levine et al., 2005, Jack and Suri, 2016, Allen et al., 2016).

Figure 3.3: Function of bank financial intermediation on poverty reduction



Source: Pande et al. (2012)

3.4.2 Distance to the bank/financial intermediary

The geographic distance to access financial intermediary services and products plays a crucial role in how poor households use these services (Aportela, 1999). In most countries, formal financial intermediaries are seldom located in low-income neighbourhoods (Mullainathan and Shafir, 2009). According to Iqbal and Sami (2017)

the number of bank branches had an effect on the financial condition and the living standards of low income households in India. Bank branch expansion in the geographic areas where poor people live reduces poverty in that the poor are able to access the services of financial intermediation (Cull, Demirgüç-Kunt and Lyman, 2012; Burgess and Pande, 2005; Bruhn and Love, 2009; 2012).

The geographic distance of financial intermediaries which has limited the access and use of formal finance by poor households affirms the distributional role of financial intermediation effect to poverty reduction (Beck et al., 2009). However, Jeanneney and Kpodar (2011), and Levine (2005) argue that benefits of economic growth to the poor can be offset by income inequality. Economic systems with poor infrastructure have low outreach for formal banking systems (Beck et al., 2008). Most developing countries have infrastructure challenges which have further obstructed the role of financial intermediaries in poverty reduction. Andrianova and Demetriades (2008) did not support the distributional role of finance-growth nexus in poverty reduction where there is acute or high concentration of poverty. Thus the poverty reduction benefits of economic growth cannot be sufficient if there are geographic barriers for sufficient use of formal financial services and products by the poor.

3.4.3 Financial innovation and its role to poverty reduction

Innovation in the financial sector such as electronic finance (e-finance) and mobile money have bridged the financial access gap (Beck et al., 2007; Demirgüç-Kunt et al., 2008). According to Bill and Melinda Gates Foundation (2017), two billion people have remained out of the formal finance mainly due to lack of options that suits their needs in the formal economy. Mobile money is bridging this financial exclusion gap as it is cheap, accessible and affordable as compared to the traditional financial intermediary alternative such as banks (Ouma, Odongo and Were, 2017). The IMF (2017) defined mobile money as

> '*digital medium of exchange and store of value facilitated by mobile money agents and stored in mobile money accounts, and accessible through mobile phones*'.

The presence/absence of banking branches (geographic access) has been the indication of access/lack of access to a banking outlet. The internet banking and

mobile money provides the other channels in which financial services are delivered financial services without the need of a physical banking outlet (Beck et al., 2007; Demirgüç-Kunt et al., 2008). The digital banking especially in the form of mobile money has been successful in bridging the cost, geographic and gender barriers to financial services (Global Findex, 2017, Suri and Jack, 2016). The World Bank (2014) asserted that seventy-five percent of the poor people live in the rural areas of which the mobile signals cover ninety percent of the rural population connecting the service providers to the market of their financial services. Suri and Jack (2016) postulated that access to mobile money has a poverty reducing effect by improving household consumption in the long term, changes in occupational choices (from subsistence farming to operating small businesses) and better financial management.

According to the Global Financial Index (2017) mobile money has been critical and successful in banking at low cost the populations that have been difficult to reach such as the poor, rural populations and women. The provision of low cost mobile banking accompanied with high transaction volumes has made the model also profitable to service providers (Global Findex, 2017). Rasmussen (2010) argues that the conventional banking costs are twenty-six percent more expensive that the branchless banking. This has enabled more adoption of branchless banking such as mobile money by the poor households (Rasmussen, 2010). According to the World Bank (2017) the notable successes in mobile money in African countries are in Kenya (M-PESA), Zimbabwe (ecocash) and Namibia (mobipay). Kenya has the largest pool of poor people participating in the mobile money market whilst Zimbabwe and Namibia although the pool is small as compared to Kenya they however have the greatest inclusion as they have availed new services and products via mobile money (World Bank, 2017). In this the mobile money has been instrumental in providing the poor with transfers, payment and savings instruments which they previously did not have access to in the formal financial markets (Ouma et al., 2017).

The access to the saving opportunities via mobile money has enabled financial management by the poor via the precautionary and commitment savings which has allowed them to smooth consumption and manage their risks (Wilson et al., 2010; Honohan and King, 2012; Shem, Misati and Njoronge., 2012; Jack and Suri, 2014; Ouma et al., 2017). Jack and Suri (2014) observed that the M-PESA users were able

to absorb severe negative shocks using their mobile savings without altering their consumption levels as compared to the non M-PESA users whose consumption fell by 7 percent after a major shock. Furthermore, the access to mobile money facilitated the occupational switch in Kenya from farming to operating businesses using the savings opportunities accorded by the mobile money (Suri and Jack, 2016). Dupas et al. (2018) further observed that in poor countries (Malawi and Uganda) even when provided with no frills bank account some poor households did not use the bank account either because they are too poor to save or the products were not tailor made to suit their needs.

The other narrative for non-use of the formal banking services was the perception by the population as generally banking fees are highest in Africa (Beck, et al., 2008). This switch to the traditional financial services can be as a result that as consumer are aware of financial services products mobile money is inadequate in providing a range of services that are needed especial on the insurance dimension. Mobile money has further enhanced the intermediation to poor households by participating in the payment market including remittances market (World Bank, 2018). Mobile money has been effective in squeezing the cost of remittances below that of the formal financial institutions such as banks (World Bank, 2018). According to the World Bank (2018) the average cost of remitting money using mobile money is on average 4.2% compares to a 7% average when using cash and bank accounts. The regulations in the banking systems such as know your customer (KYC), and the anti-money laundering (AML) has made the payments facilitation formally using the banking system very expensive. Giuliano and Ruiz-Arranz (2009) argued that remittances have been an alternative source of finance for most recipients either for consumption, risk management and capital accumulation.

In a nutshell digital innovation especially mobile money is making great inroads in banking the unbanked and the underserved with financial services even in areas that have been difficult to reach for the traditional banking services (Global Findex, 2017).

3.4.4 Collateral requirements

The World Bank asserts that there is a mismatch on the collateral requirements by banks and the type of collateral the unbanked are willing to offer. Beck (2006) argues that financial intermediation reduces poverty by broadening access to financial services and efficient allocation of savings. Demirgüç-Kunt, Beck and Honohan (2008: 129) states that poverty is not only reduced by access to credit by the poor but they should also have access to savings, payment system and insurance. In most transition economies the poor are locked out of the formal credit and they use the microfinance which does not necessarily use collateral as a lending barrier. According to Bester (1987) in the absence of collateral, lenders rely on interest rate in risk pricing at the expense of crowding out good risks. However, Jeanneney and Kpodar (2011) argued that the banking systems are more beneficial to the poor through the savings and the transaction opportunities than the credit availability opportunity.

The International Monetary Fund (IMF) (2015), opines that poor households are regarded as high risk and end up paying more for credit than middle and upper income individuals. In most developing countries the poor have been the major market for microfinance than formal intermediaries for access to financial intermediation (Burgess and Pande, 2005). However, the role of the microfinance in poverty reduction is not a subject for this study and it will not be further argued as the study seeks to examine the role of formal finance in reducing poverty in selected developing countries. There have been alternative channels for access and use of financial services that have emerged due to improvements in financial innovation such as mobile money and internet banking (Rasmussen, 2010; Dupas et al., 2018).

The emergency of these alternatives such as mobile money for accessing and using financial services has proved to reach the poor at reduced cost (Beck et al., 2005; Jack and Suri, 2016). More on how digital innovation has improved the breadth of financial services was discussed in section 3.4.3 as they are opportunities for access and use financial intermediation. In most developing and emerging economies, the poor are seldom serviced formally for saving, risk management and payment services (Pande et al., 2012). The availability of these alternatives through digital innovations has enabled savings, credit, payments and insurance via mobile devices.

3.4.5 Entrepreneurship channel

Ayyagari, Beck, and Hoseini (2013) reiterated that financial intermediation reduces poverty by the entrepreneurship channel whereby finance enables more entrepreneurship to thrive. Saint-Paul (1992) argues that intermediaries enable the expansion and risk diversification by entrepreneurs as they provide the much need capital. De Gregorio and Kim (2000) concurred that intermediaries allow entities to specialise in skills beneficial for industrial development. Financial intermediation enables entry and growth of new firms, removes new firms' financial constraints as they access the credit and risk management services to protect their businesses there by supporting the growth of businesses (Klapper, Laeven, and Rajan, 2006; Beck, Demirgüç-Kunt, and Maksimovic, 2005). However, the World Bank (2016) stated that over 200 million formal and informal, micro, small and medium-sized enterprises (MSMEs) in emerging markets lack sufficient financing to expand their businesses. According to the World Bank (2016), the MSMEs mostly cite lack of collateral, credit history and the informality nature of their business as the reason of not using formal financial services. Improving the efficiency of the financial intermediation process without broadening access of the financial services is insufficient for poverty reduction (Demirgüç-Kunt, et al., 2008: 138).

3.4.6 Savings and risk management

According to Schumpeter (1911) financial intermediation through the banking system plays a fundamental role in the process of improved wellbeing by affecting the allocation of savings and management of risk. The screening and risk pooling ability of financial intermediaries is necessitated by high set up cost which the poor households aren't able to pay for in the formal financial intermediaries (Greenwood and Jovanovic, 1990; IMF, 2015; Pande et al., 2012). The National Tresuary (2018) postulates that financial services allow people to make daily economic transactions, save and preserve wealth to meet future goals and retirement needs, and insure against personal disaster. Insufficient access to finance has kept the poor people trapped in poverty (National Treasury, 2018).

Besides credit, the poor can benefit from financial intermediation via savings and risk management such as insurance opportunities provided by financial intermediaries (Keynes, 1937a; b; McKinnon, 1973; 2010; King and Levine, 1993; Claessens and Feijen, 2007; Kiendrebeogo and Minea, 2016). Information gaps in the market have further constrained access to formal financial services by the poor excluding them from using formal risk management services provided by these intermediaries (Beck et al., 2007; Demirgüç-Kunt and Klapper, 2012; Karlan et al., 2014). Mullainathan and Shafir (2009) argue that formal financial intermediaries such as banks treat the low income households and the high income households differently. Banerjee and Duflo (2007) lamented that the poor mainly participate in the informal saving service.

Formal banking institutions tend to market their products differently to households, promoting credit over savings to lower income earners whilst the wealthy households' savings is promoted over debt (Mullainathan and Shafir, 2009). Thaler (1999) opines that the low income earners equally need the help of formal finance with regard to formal savings as there is a greater tendency of unnecessarily spending cash in hand than the cash in the bank. Brune, Giné, Goldberg and Yang (2016) further support this assertion by arguing that lack of self-control led to funds depletion of agricultural income of Malawian households. However, there was an increase in output for households who had access to formal savings, as the formal services assisted in preserving the agricultural income between the harvest and the next planting period (Brune et al., 2016).

Burgess and Pande (2005), stated that a percentage increase of bank share of savings in rural India reduces poverty by 2.22 percent. Hence enabling the poor with formal savings vehicles reduces poverty (Dupas and Robinson 2013; Brune et al., 2016; Karlan, Ratan, and Zinman 2014; Prina 2015). The studies argued that access to formal financial services enables asset build-up which in turn can proliferate investment activity and smooth consumption (Carvalho et al., 2016a). Zhan and Sherraden (2011) and Prasad (2010) reiterated that the savings accumulation by poor household improves the education attainment by their children which in turn increase the income of poor households. In a different study in Chile, Kast and Pomeranz (2014) found out that access to formal savings reduces the formal debt of the study participants by twenty percent. These formal savings provided self-insurance to

economic shocks improving the welfare as the households did not need to reduce consumption (Kast and Pomeranz, 2014; Karlan et al., 2014). Inadequate formal savings opportunities makes it harder for the poor to diversify their savings and to initiates projects that can increase their future incomes (Prasad, 2010).

3.5 Role of Institutional Quality

Poverty is not only an economic problem but is also made out of interactions of social and political processes effectively mediated by the existing institutional frameworks (Deolalikar, 2002). Cepparulo et al. (2017) postulated that the role of financial intermediaries in poverty reduction can be achieved via other channels than the one working through growth. This supported the previous assertion by Law, Azman-Saini and Ibrahim (2013) who state that the effect of finance in the real economy is contingent to the quality of institutions. Market inefficiencies and resources misallocations are muted to be the ways in which institutional quality influence poverty (Tebaldi and Mohan, 2010). Hence Cepparulo et al. (2017) and Law et al. (2013) suggested that there exist other channels than the growth channel in which finance can be an epitome of poverty alleviation.

Cepparulo et al. (2017) suggests that resource allocation by financial intermediaries with inadequate institutional frameworks cannot reduce poverty. This supports the previous assertion by Claessens and Perotti (2007) who state that financial intermediation succeeds in reducing poverty only if it is matched by a build-up in oversight institutions. In examining the role of institution on poverty incidences, Chong and Calderón (2000) posit that high institutional quality reduces poverty incidences. The study however, used the share of government spending on defence which can be correlated to poverty resulting in endogeneity problems (see Tebaldi and Mohan, 2010; Perera and Lee, 2013). Allen, Carletti and Valenzuela (2013), argue that financial markets are effective in causing changes in the real economy if a minimum level of efficiency by institutions is reached.

The institutional quality fosters the poverty reducing effect of finance through the strengthening of the rule of law, oversight of financial regulation and the enforcements of contracts. As the rule of law and contract enforcements is respected more financial

intermediaries will be willing to improve the breath of the financial intermediation. Acemoglu and Robinson (2013), opined that the poverty of nations is not determined by geography and culture but by the state of the nation's institutions. This concurred with the assertions of Olson (1996) and Chong and Calderón (2000) that institutions play a significant role in poverty reduction. However, Perera and Lee (2013) disputed the role of institutions in reducing poverty incidences as it was stated that the institutional reforms (for example bureaucratic quality and democratic accountability) worsens income distribution. This assertion on the role of bureaucratic settings in worsening poverty incidences concurs with the Marxist theory (discussed in Chapter 2) on the determinants of poverty that the bureaucracy allows the political and economic powerful to determine the distribution of resources in an economy (Rajan and Zingales, 2003; 2004; Perotti and Volpin, 2007; Claessens and Perrotti, 2007).

3.6 Changing Functions of financial intermediation

Despite the importance of traditional role of intermediaries, Allen and Santomero (1997) asserted that over the years the role of financial intermediation has evolved to facilitators of risk transfer and dealing with complex financial instruments and markets. Additionally, Allen and Santomero (2016) opined that as the breadth and depth of intermediation has increased, participation has shifted from direct participation by individuals to participation via various kinds of intermediaries. The complexity of the new financial products and services has limited the use of such services by the poor due to lack of financial literacy (Kelkar, 2014; Nanziri, 2016; Iqbal and Shami, 2017). Most of the complex instruments have alienated the poor in participating in these financial instruments due to lack of knowledge denying them the opportunity of inflation hedging and capital accumulation (Pande et al., 2012; Rewilak, 2017). A change in the mix of activities performed by the financial sector resulted in the adoption of some activities that do not offer any economic value and do not enhance welfare (Turner, 2010; Demirgüc-Kunt and Huizinga, 2010; Beck, Degryse and Kneer, 2014). If these assertions are applicable to emerging markets it is imperative for this study therefore to ask if the role of financial intermediation is still central to equitable resource allocation for poverty reduction. According to Beck (2007), policy-makers should also be interested in the efficiency of financial intermediaries rather than only the amount of savings that are channelled by intermediaries to deserving borrowers.

Some developing economies focused of the savings and capital mobilisations and neglect the functional perspectives of financial intermediaries (Otchere, Senbet and Simbanegavi, 2017). This has limited the availability of formal intermediaries in areas where there is uncertainty to the profit maximisation goal (Allen and Gale, 1995). Financial intermediation focuses the provision of services on users with promising prospects as they aren't willing to bear any risks under uncertainty (Greenwood, Sanchez and Wang, 2013). These profit maximisation drives usually rely on the population density as a deciding factor in the provision of formal intermediary services in Africa than anywhere else (Allen et al., 2012). Allen et al. (2012) further quizzed the inadequacy of financial intermediaries in certain parts of the African continent to effect poverty reduction as a result of policy failures than the financial role of these intermediaries.

3.7 Domestic Public Debt

The central government raises income using three main sources namely tax revenue, money creation and borrowing (debt). This study is only going to look at how government borrowing impact the levels of poverty levels in a financial intermediation setting rather than the evolution of debt and the various components of public debt in detail. The inclusion of the variable is not to extensively argue the effects of its components on the financial intermediation process as it is outside the scope of this study. Domestic debt is muted to have crowding out effects which reduces bank lending to the private sector investments (Christensen, 2005, Ismihan and Ozkan, 2012). Christensen (2005) argued that a percentage increase in domestic debt reduces private lending by 15 percent in most African countries that were under study. According to Christensen (2007), sovereign participation in the domestic debt markets taps into the domestic savings which could have been made available to the domestic private sector. Furthermore, unsustainable domestic debt and debt servicing creates a vacuum of resources as it substitutes the sovereign long term investments in health, education and infrastructure (Peria and Schmukler, 2017). As compared to the external debt the domestic debt is said to be more expensive as there are few other alternatives for government to borrow except for the banking sector

In low income countries domestic debt is more short term than long term debts which potentially contributes to financial crisis (Brunnermeier, 2009; Raddatz, 2010; Beltratti and Stulz, 2012; Broner, Lorenzoni, and Schmukler, 2013, Peria and Schmukler, 2017). The short term nature of the domestic debt markets further increase liquidity for sovereigns in low income countries due to the rolling over of large debts (Abbas and Christensen, 2007). Holding of public domestic debt by the financial sector reduces financial deepening and efficiency of the as the financial sector may be profitable without enhanced competition (Hauner, 2006). Furthermore, in economies that lack diverse investor base government borrowing result in increase in interest rates which crowds out investments by the private sector (Christensen, 2005; Arnone and Presbitero, 2010; Bua, Pradelli and Presbitero, 2014). This is further worsened by the large concentration of commercial banks as investor base for government borrowing as the small and medium enterprises debt is mainly from the banking sector that the capital markets (Demirgüç-Kunt and Levine, 2000; Hauner, 2006; Broner et al., 2013; Bua et al., 2014).

A decrease in private lending can affect the poor due to credit rationing as less money will be available for private lending (Stiglitz and Weiss, 1985; Hauner, 2006; Broner, Erce, Martin, and Ventura, 2014). Ismihan and Ozkan (2012) argues that in economies that have lower financial depth government borrowings have severe consequences to the financial intermediation process and the outcomes in the real economy. Sovereign debt and high debt servicing cost further crowds out investments in crucial services such as health, education and infrastructure further worsening poverty levels (Kirchner and van Wijnbergen, 2016, Peria and Schmukler, 2017). However, Asonuma, Bakhache, and Hesse (2015) suggested that holding of government debt by the domestic financial markets is beneficial for fiscal consolidation.

The interaction of public domestic debt and poverty incorporated in the financial intermediation setting is seldom researched in previous literature. It is therefore the aim of this study to further examine how domestic debt can affect the ultimate reduction in poverty levels high domestic debt levels can affect the private lending process (Peria and Schmukler, 2017). According to the World Bank (2018) sustainable sovereign debt is associated with countries' advancements in executing Poverty Reduction Strategies (PRS) and macroeconomic and essential social reform

programs. High domestic debt ‘crowds out’ social programs as the government revenue is used for debt servicing than on social and developmental programmes (Bua et al., 2014; Kirchner and van Wijnbergen, 2016).

3.8 The Economic growth argument

There are arguments in literature to the effect that financial intermediation reduces poverty via its effects on economic growth (Odhiambo, 2009; Soederberg 2013). It is worth for this study to note the arguments that have been postulated on the effect of finance via economic growth in poverty reduction. There has been mixed findings of the role of formal finance in poverty reduction via economic growth. Soederberg (2013) asserted that access and inclusive formal finance can be a mechanism for growth and poverty reduction. The World Bank (2008), argues that deep financial markets are a positive driver for economic growth hence the improved standard of living. Finance influences economic growth and income distribution thereby affecting the level of poverty in any economy (Beck, Demirgüç-Kunt, and Honohan, 2009, Jeanneney and Kpodar, 2011). Ayyagari et al. (2013) concur by stating that financial intermediaries help in equally dividing the benefits of economic growth by increasing the flow of capital to the poor.

According to Beck et al. (2007) finance is pro-growth but questions still remain if finance is also pro-poor. As much as the finance has been pro-growth the benefits of growth hasn’t been equitably distributed as it remains centralised to areas with geographic access to financial intermediaries (Beck et al., 2009). This has contributed to inequalities especially in the developing countries where poor infrastructure usually excludes the poor from easy access of formal financial services (Jeanneney and Kpodar, 2011). Turner (2010) argues that the 2007-2009 global financial crisis was a result of the increase in the scope of financial intermediation. This would mean that increase in the scope of financial intermediation without proper monitoring by financial intermediaries is not always beneficial for the real economy (Clarke Xu and Zou, 2006). Thus, this study attempts to contribute to insights on the other channels than the growth channel in explaining the link between financial intermediation and poverty alleviation.

Todaro (1997) argues that progress in economic growth does not necessarily translate to improved livelihoods of poor people. This was supported by (Christiaensen and Demery 2007; Suryahadi, Suryadarma and Sumarto, 2009) who argued that poverty reduction through economic growth differ across sectors. Although economic growth is necessary for poverty reduction it is not sufficient if it is not accompanied with progressive distributional changes which include the distribution of financial services and products (see Ames, Brown, Devarajan and Izquierdo, 2001, Allen et al., 2012). Christiaensen and Demery (2007) and Suryahad et al. (2009) further asserts that poverty can be alleviated if it happens in sectors where the poor can easily access the benefits brought by economic growth.

Furthermore, Salem and Donaldson (2016) asserted that although economic growth is an important factor in increasing the income of the poor, it was not the only or the supreme pathway. Analysing economies that had experienced progressive poverty reduction for a period of twenty-five years, Saleem and Donaldson (2016) suggested that there are other pathways for poverty reduction than the growth channel. Moreover, Deaton (2006) argued that economic development is a better assertion to poverty reduction than economic growth hence economic growth is necessary but not adequate to be the epitome on the effects of finance on poverty. Sen (1983) argued that economic growth is an aspect of development which Todaro and Smith (2015) defined as an improvement in living conditions, self-esteem and a free and just society and best measured by the Human Development Index (HDI).

Irrespective of experiencing progressive economic growth post colonialism, most developing economies are subjected to persistent poverty. This persistent poverty has academics and policy makers looking for answers in the financial sector as a tool for poverty reduction. This has cast doubt on the efficacy of economic growth channel as the most important conduit through which finance reduces poverty in economies that are subject to high levels of inequality (see Levine, 2005, Fosu, 2017). Deaton (2013: 18) argued that there should be a holistic approach which separates itself from the parochial view of poverty by academics and researchers alike. For example, it was argued that progress in national income growth cannot be studied separate from progresses in health care for policy making initiatives on poverty reduction (Deaton, 2013; Naceur et al., 2017). Nanziri (2016) argued that studying the role of finance that

ignores financial literacy and gender will fall short of addressing the welfare benefits of finance.

Hoff and Walsh (2018) concurred that poverty has many dimensions but lack of income is the most manifestation of all poverty factors. Increasing the outreach of financial intermediaries has the capacity of reducing poverty in low-income households (Beck, Demirgüç-Kunt and Honohan, 2009). According to the International Monetary Fund (IMF), (2016) there is an optimal level of financial intermediation that maximises its social value. Naceur et al. (2017) argues that the effect of the financial sector in the real economy varies across regions. The OECD (2017) narrated that economic growth is inadequate to reduce poverty in societies with high inequality and a lack of social cohesion. The inadequacy of economic growth as a catalyst for poverty is supported by Asongu and Kodila-Tedika (2017) that irrespective of resurgence of economic growth in most developing and emerging economies these countries have failed to meet the MDGs goals of reducing extreme poverty (see Fosu, 2015).

It is therefore imperative for this study to determine if there are other channels than the growth channel in which financial intermediation can be key to poverty reduction. Most products and services offered by formal financial institutions lack the value proposition for the excluded households and enterprises. This study will contribute by coming up with other channels of financial intermediation as a tool for poverty reduction by having a comparative study for the regional blocks. Although Rewilak (2013) had a comparative review of regional blocks the study was more of an extension of data to the Dollar and Kraay (2002) study. Focus was mainly on the trickle-down effect of economic growth than investigating if there are other channels in which financial intermediation can be a tool for poverty reduction (Rewilak, 2013). Kelkar (2014) referred use of sustainable formal finance as an economic security for both the rich and the poor hence inclusive formal financial intermediation is a necessity for an improved standard of living.

Jeanneney and Kpodar (2011) focus on the money and credit as the channels in which formal finance directly affect poverty whilst Cepparulo et al. (2017) opines on the direct channel of strong institutional frameworks. Leftwich and Sen (2011) argued that for poverty reduction, social cohesion and political behaviours are shaped by the

institutional quality. This suggests that institutional quality plays a role on how financial intermediation affects poverty. Quality institutions which includes but not limited to rule of law, property rights and bureaucracy in governments. However, the studies mostly looked at financial development which includes not only the functional role of financial intermediaries but also the institutional perspective of finance. There hasn't been any conclusive agreement to explaining why some nations are left behind in reducing poverty irrespective of experiencing progressive growth (Fosu, 2015). Rewilak (2017) argues that efficiency of financial intermediaries in facilitating transaction in a sustainable way is crucial as a direct effect of finance for poverty reduction. Deep financial markets which are wasteful are not beneficial in alleviating of even mediating the poverty of the poor people.

In most developing and emerging economies poverty has remained persistent irrespective of multiple poverty reduction strategies in place. The main focus area of the available research on the role of finance on poverty reduction is on the indirect channel via economic growth (see King and Levine, 1993; Dollar and Kraay, 2002; Odhiambo, 2009; 2010, Beck et al., 2008; Levine and Zervos, 1998; Beck et al., 2000; Beck and Levine; 2004). Most studies focus on financial development however this study will mainly focus on financial intermediation which is a component of financial development. The transmission channels from financial intermediation to poverty reduction are numerous. Therefore, there is need to differentiate the impact of financial intermediation on poverty reduction and the impact of growth on poverty.

Financial intermediation can impact on poverty levels directly through changes in direct access and use of formal financial services and products and indirectly through economic growth effects. There are numerous studies that support that bank financial intermediation facilitate the access and use of formal finance by the poor in the developing economies (see Ramakrishnan and Thakor, 1984; Chandan and Mishra, 2011; Ergungor, 2010, Pande et al., 2012; Prina, 2015). Most studies on the role of finance in poverty reduction are based on financial development than financial intermediation (see Honohan, 2004; Jalilian and Kirkpatrick, 2005; Beck et al., 2007; Odhiambo, 2010; Perez-Moreno, 2011; Jeanneney and Kpodar, 2011 and Sehrawat and Giri; 2015). Beck et al. (2007) argued that financial development includes other activities by financial intermediaries which neglects the traditional role of

intermediation and supports the take up of more activities that do not necessarily enhance welfare.

Subject to the reviewed literature this study does not seek to re-examine the finance-growth nexus, nor does it re-evaluate the financial intermediation and poverty relationship (see Honohan, 2004). Rather, the study seeks to identify other channels in which financial intermediation can be a catalyst for poverty reduction. Furthermore, the study seeks to examine the contegrating relationship between financial intermediation and poverty as well as the causal links between finance and poverty. Thus, the approach of the study complements the finance and poverty literature by examining whether financial intermediation and the other dimension of finance exerts a significant influence on improving the living conditions of the poor. There are few studies that the researcher is aware of that sought to review the direct relationship between finance, poverty and inequality (Honohan, 2004; Quartey, 2005; Beck, Demirguc-Kunt and Levine, 2007; Cull, Demirgüç-Kunt and Lyman, 2012, Rewilak, 2017). Most available studies focus on the financial development than the component of financial intermediation however in most cases developed financial markets do not necessarily mean access and efficiency in servicing the larger population sustainably. This study therefore looks at the components of finance as reflected by depth, access, efficiency and stability and how these aspects are related to poverty. Financial intermediation reduces poverty in a number of ways through the already discussed function of finance in section 3.2.

Financial intermediation improves financial avenues for the low income earners and the poor to participate in formal financial activities (Beck et al., 2007; Pande et al., 2012). This is achieved by financial intermediations role in reduces market failure such as information asymmetry and efficiency in lending (Jalilian and Kirkpatrick, 2002; Stiglitz, 1998). Access to formal financial services enhances the productive capacity of the micro-sectors and poor households there by enhancing their welfare (Jalilian and Kirkpatrick, 2002; World Bank, 2001). Deeper financial intermediation reduces the external cost of enterprises (Rother, 1999; Rajan and Zingales, 1996). In this regard more can be invested in the entrepreneurial projects improving capital accumulation thereby reducing poverty (Li, Squire and Zou, 1998, Rajan and Zingales, 2003).

Futhermore this has a poverty reducing effect in that the financial intermediaries are able to increase the available credit to which the poor can access and this can improve poverty incidences as the poor are able to smooth consumption, invest in human capital and manage their risks (Li et al., 1998, Allen et al., 2016). Honohan (2004) further argues that deeper financial intermediation reduces poverty although the results are sensitive to the proxies used for poverty and financial intermediation. However, there are mixed findings on the effect of increasing the depth of financial markets as it can also be accompanied with financial fragilities (Honohan, 2004; Rewilak, 2017). The poor are more prone to external shocks than the affluent as the poor mainly lack he risk management instruments to hedge their small resources (Claessens, 2006, Honohan, 2008).

Rewilak (2017) and Cull, et al. (2012) lament that most studies available in literature focus of the depth of finance neglecting other dimensions such as access, efficiency and stability. In this regard as there are improvements in the data available especially on the access dimension, this study will include the variable and contribute to literature on how access to formal financial intermediaries' services and products can reduce poverty. Moreover, the previous studies that have included this variable in their studies have used time series studies (see Cull et al., 2012; Rewilak, 2017). The time series studies might have endogeneity problems hence the study adopts the panel data analysis. There are other distributional policies mainly in Africa to address inequalities such as land reform that however, may, if not accompanied by proper policies may not address core and long-term challenges of poverty. There are few studies that the researcher is aware of that have included the four dimensions of financial intermediation in poverty studies (see Naceur et al., 2017; Rewillak, 2017).

Furthermore, research is inconclusive on which sector of the financial markets has more influence in poverty reduction. Naceur and Zhang (2016) argued that the banking sector than the stock market has more influence on the role of finance in poverty reduction. However, in a different study Makina and Fanta (2017) suggest that the bond market has more effect on growth than the banking and stock market which influence growth which in turn helps in the reallocation of resources and reduces poverty. These studies (Naceur and Zhang, 2016; Makina and Fanta, 2017) were however based on time series studies which might be a challenge for this study to look

at different financial markets effects on poverty as in some developing countries the bond market and the stock market data is not available. Furthermore, the bond market has limited potential as compared to bank finance as participants in the bond market are mainly large enterprises (Gormley, Johnson and Rhee, 2006; Beck et al., 2009). This study will focus on selected developing countries in Africa and Asia depending on data availability.

3.9 Chapter summary

The present empirical literature review chapter has discussed the financial intermediation landscape and the functions of financial intermediaries to contextualise the importance of finance in poverty reduction. In most transitioning economies the provision of finance to the poor is mainly in the form of grants and subsidised social programmes with little or no active formal finance participation in providing financial products and services to the poor. The main functions of finance have been easily accessed mainly by the middle and high income individuals. There are mixed assertions on the role finance via economic growth in reducing poverty. If the growth is not equitably distributed it cannot benefit the larger population.

Furthermore, the chapter discusses how the opportunities and challenges in the financial landscape can be a catalyst or binding on the sustainable access and use of formal financial services. Collateral requirements and payroll based banking services have limited the participation of the poor in the formal finance, and this has further denied them the opportunity of improving their livelihoods. Digital innovations such as mobile money have been instrumental in banking the poor. Mobile phones and networks are ubiquitous and the service has been able to reach the larger population at low cost. It is suggested that the access to financial services using the mobile money has been able to reduce poverty as the poor are now able to save, borrow and make payments using their mobile devices (Jack and Suri, 2016). Furthermore, institutional quality is suggested to be a component for effective and efficient provision of financial services. Debt levels in most transitioning economies have been growing at an alarming rate in which the sovereigns borrow from the domestic market crowding out private investment (Kirchner and van Wijnbergen, 2016). The following chapter

engages in the development of the hypotheses that are deployed as the points of departure for the present study.

CHAPTER 4

HYPOTHESIS DEVELOPMENT

4. Introduction

This chapter delves into the development of the hypothesis of the study. To date, the role of financial intermediation in poverty reduction has no conclusive debate as there is a multiplicity of contesting standpoints and suggestions. Financial intermediaries have a poverty reducing effect either directly or indirectly via economic growth (Dollar and Kraay, 2002; Honohan, 2004; Beck, Demirgüç-Kunt and Levine, 2004). Most of the available literature on the role of finance in poverty reduction focus on financial deepening without including the other aspects of finance (Dollar and Kraay, 2002; Honohan, 2004; and Beck, Demirgüç-Kunt, and Levine, 2007). However, there are other aspects of the financial sector such as the instability of the financial system which is more detrimental to the poor than the rich (Jeanneney and Kpodar, 2011) and access to the finance which is beneficial to the poor (Claessens and Perotti, 2007, Rewilak, 2017). Furthermore, the benefits of growth in reducing poverty can be undermined by income inequality (Kanbur, 2001). As has been witnessed in the 2007/9 global financial crisis, the performance of the financial system has an effect on the real economy. This study seeks to identify the channels through which financial intermediation (including the other aspects of intermediation such as efficiency, stability and access) reduces poverty. From here this chapter proceeds to explore the hypotheses for this study.

4.1 Hypotheses

This chapter aims to provide a link between the reviewed literature and the methodology chapter that follows this one. Kerlinger (1956) stated that a hypothesis is an intellectual statement predicting the relationship between two or more variables. This view was supported by Creswell (2014) who defined a hypothesis as a formal declaration presenting an expected relationship between variables in research. The main reference point for the hypothesis development of this study is the objectives that are stated in the introductory chapter (Chapter 1). The main objective of the study is

to examine the deterministic relationship between financial intermediation and poverty in selected developing countries. Furthermore the to the study seeks to examine the cointegrating and shot run relationship between poverty and financial intermediation. Additionally the study examines the causal relationship between poverty and financial intermediation.

The hypothesis developed from the above objectives is empirically tested in this study. The hypothesis outlined in this chapter provides a link between the reviewed literature and the methodology chapter of the study as stated earlier.

Hypothesis 1: There is no relationship between poverty and financial intermediation.

Levine (2008) opined that intermediation alone without the access to the financial services is inadequate. Levine et al., (2008) asserted that access to finance by poor households maybe poverty reducing as the poor have funding for education and business undertakings. However, Inoue and Hamori (2016) argued that the extension of scale of financial services (depth) without the expansion of the financial networks is inadequate to effect any change in the real sector. Not only is the credit availability beneficial to the poor but the availability of saving and insurance vehicles enables consumption smoothing from the accumulated wealth as savings (McKinnon, 1973; Rewilak, 2017). Without financial intermediaries households do not invest in highly illiquid productive assets against economic shocks (Pagano, 1993). Rosenzweig and Wolpin (1993) postulated that in the absence of financial intermediaries, grain, livestock and other physical assets are the main forms of storing and accumulating wealth by the poor. In the event of any economic shock, wealth accumulated using these saving tools is easily lost, worsening the plight of the poor people (Rewilak, 2017).

In the midst of income inequalities Prokopenko and Holden (2001) argued that it is possible for the economy to grow with little or no value to its poor households. Similarly, Aguera (2015) observed that the distributional benefits of financial systems depend on where one lives, indicating that there is a geographic barrier for the benefits of finance via economic growth to proliferate to the poor households. On the contrary,

it was argued that access to the financial products and services by the poor has a poverty reducing effect among the poor households (Prokopenko and Holden, 2001, Rajan and Zingales, 2014). Access to finance enables the poor to accumulate capital and invest in education (Beegle, Dehejia, and Gatti, 2003; Dehejia and Gatti, 2005). In Peru Jacoby (1994) argued that the perpetual poverty was due to lack of access to credit as the poor households were unable to invest in education for their children. This view was supported by Jacoby and Skoufias (1997) as they as they found a reduction on investment in schooling due to temporary shocks in poor Indian households. Linking poverty to child labour Beegle, et al. (2003) and Dehejia and Gatti, (2005) observed that access to finance allowed the poor to diversify and invest in education as access to credit facilities reduced child labour and there was an increase in school enrolments by poor households. Furthermore, it was asserted that child labour was prevalent in economies with underdeveloped financial systems accompanied with income variability (Dehejia and Gatti, (2005).

Unlike in underdeveloped financial systems, Beck et al. (2007) argued that countries with better financial intermediaries experience declining poverty and inequality as access to intermediary services boosts the income of the poor. However, if the access to financial intermediation is limited to the poor it can result in income inequalities worsening the poverty level in the economy (Greenwood and Jovanovic, 1990). Rajan and Zingales (2014) reasoned that if financial intermediation is crucial for poverty reduction, why is there a failure of the emergence of effective financial institutions to unlock access to finance and spread the opportunities of the financial systems.

It was argued that the political connections influence the efficiency of the financial systems by concentrating credit resulting in limited access of credit by the poor (Pagano and Volpin, 2001, Rajan and Zingales, 2014; Singh and Huang, 2015). Politically motivated lending is higher in economies with high bank concentration (few large banks) and high net interest margin whih is a phenomenon of most developing countries. This is more common in underdeveloped financial systems with lack of institutional structures for law enforcement, effective regulatory and supervisory authorities (Jappelli, Pagano and Bianco, 2005; Rajan and Zingales, 2014). Mainly the underdeveloped financial systems have limited access to financial services as they also lack efficient judiciary systems, which are a prerequisite for a vibrant credit market

(Jappelli et al., 2005; Rajan and Zingales, 2014). This argument borders on the notion that institutional quality is crucial for facilitating the effectiveness of financial intermediation in reducing poverty (North, 1991, Knack and Keefer, 1995). North (1991) argued that the reason of stagnation in the world is mainly because the respective countries have failed to develop low cost contract enforcements.

Payment facilitation by financial intermediaries is crucial for poverty reduction in that the facilitation of low cost transactions enables trade and specialisation by economic units which in turn spurs economic growth creating more jobs and increasing the incomes of the households (Levine, 1997). On the contrary Ferreira, Leite and Ravallion (2010) argued that it is possible to reduce poverty without improvements in economic growth as was observed in Brazil for the period of 1985-2004. The poverty reduction for this phase was mainly through controlling hyperinflation and increasing social security and social assistance transfers. Furthermore, the payments facilitation by financial institutions can be in the form of facilitating remittance transfers, which have been argued to have poverty reducing effects (Lucas, 1998; Yaron et al., 1998; Anyanwu and Erhijakpor, 2010; Inoue, 2018). Jeanneney and Kpodar (2011) argued that any distortion to the financial payment system is more detrimental to the poor than it is to the rich.

Despite the effect of remittances in reducing poverty in developing countries this has been constrained by high cost of formally remitting money in developing countries (Beck and Peria, 2009; Giuliano and Ruiz-Arranz, 2009). The World Bank (2018) argued that remitting money in sub-Sahara Africa is the most expensive as compared to the other regions of the world. Inoue (2018) argued that remittances reduce poverty in recipient countries as they provide consumption income and physical, human capital formation. Allowing the recipients to save the received funds further increases loanable funds with financial intermediaries boosting the credit channel of financial intermediaries (Adams and Page, 2005; Gupta, Pattillo and Wagh, 2009; Imai, Gaiha, Ali, and Kaicker; 2014; Azam, Haseeb, and Samsudin, 2016; Inoue, 2018). Although remittances were negatively correlated with poverty, studies do not, with any clarity, distinguish whether remittances are substitutional or complementary to financial intermediation (Inoue, 2018; World Bank, 2018).

Alternatively, some literature advances the argument that the indirect role of financial intermediaries on poverty reduction via economic growth can be offset by inequalities (Jeanneney and Kpodar, 2011). There is no consensus from the available literature on the relationship between poverty and finance (Jalilian and Kirkpatrick, 2001; Singh and Huang, 2015; Rewilak; 2017). Claessens and Perotti (2007) argued that lack of access to finance is the major cause of persisting inequalities in most economies. Previously Greenwood and Jovanovic (1990) argued of a nonlinear relationship between inequality and finance. However, the nonlinear relationship was refuted by, Clarke, and Zou and Xu (2003), who failed to ascertain a nonlinear relationship for the 91 countries under for 1960–1995 study period. Banerjee and Newman (1993) and Demirgüç-Kunt and Levine (2009) do not support the nonlinear relationship between finance and poverty. Clarke, Xu, and Zou (2003) argued that the relationship between financial intermediation and inequality relies on the sectorial structure of the economy.

The role of formal finance in determining who gets credit has the ultimate effect poverty and income distribution (Demirgüç-Kunt and Levine, 2009). Beck et al. (2007) argued that countries with better financial intermediaries have declining poverty levels and low-income inequality as the poor access to the intermediary services boosts their income. Credit and or money are the mainly discussed channels of financial intermediation that has an effect to poverty reduction (Dollar and Kraay; 2002; Honohan, 2004; Beck et al., 2004). However, Loayza and Rancière (2006) posited that excessive credit growth may result in banking crises which in turn is detrimental to the poor households. Availability of credit and other monetary aggregates are leading indicators of economic performance and they have the ability of reducing poverty if the poor have access to the services (Kaminsky and Reinhart, 1999).

On the contrary excessive credit can result in financial fragility if the credit is extended excessively further worsening the plight of the poor (Honohan, 2004).There is a dearth in literature on the direct role of financial intermediation dimensions on poverty except for studies by (Rewilak, 2017; Zhang and Naceur, 2018). For the studies that looked at the finance growth nexus as discussed above, the studies only examined the depth of the financial market in poverty reduction without examining the other financial dimensions. These studies have some limitations in the role of finance in poverty reduction mainly because they do not capture the role of the access dimension in

poverty reduction except for Rewilak (2017) and Zhang & Naceur (2018). Burgess and Pande (2005) and Odhiambo (2009) argued the role of financial intermediation in poverty reduction in India and South Africa respectively but these studies can be subject to external validity of the data as they are country specific studies.

Odhiambo (2009) argued the role of finance in poverty reduction in an economic growth setting and found out that finance has a poverty reducing effect. Burgess and Pande (2005) found out the increased access to finance through increasing the bread of the bank branches to the previous unbanked rural areas reduced poverty in India. Furthermore, the studies focused on time series analysis of which the data may have the endogeneity problem, which neither of the studies controlled. Demirgüç-Kunt and Levine (2009) argued that the finance inequality relationship is better examined by use of broad complementary methodologies as each methodology suffers from distinct problems. Studies using a different methodology that addresses the problem of endogeneity might find a different result from these findings. Unlike in other studies, in these studies inequality is used both as a control variable and also as a dependent variable (in separate equations) as poverty can also be used to measure relative inequality.

The relative poverty, for this study, is captured by the income inequality as measured by the Gini index. This has an advantage of capturing information that is not considered in other poverty measures such as the gross domestic product per capita and the headcount ratio, which depends on a national poverty line. Alternatively, it improves the rigour of the study as Greenwood and Jovanovic (1990) argued that financial intermediation does not improve the lives of the poor because as the financial sector deepens, inequality prohibits the benefits of deep financial markets to filter to the poor in the economy. Jeanneney and Kpodar (2011) argued that the role of financial intermediation in poverty reduction is dependent on the transmission channel. Financial intermediation per se, might not be adequate for poverty reduction if the poor households do but have access to the available financial products and services and the financial sector is not supported by good institutional quality (Singh and Huang, 2015).

Hypothesis 2: There is no cointegrating relationship or short run relationship between poverty and financial intermediation.

The role of finance in the real economy cannot be ignored as finance is said to be a catalyst of developmental finance (Greenwood and Jovanovic 1990, Demirgüç-Kunt and Levine, 2009). The role of finance in poverty reduction can either be direct through the distributional effect of financial intermediaries or indirectly via economic growth (Jeanneney and Kpodar, 2011). The functions of financial intermediaries as discussed in Chapter 3 include: easing the exchange of goods and services, pooling savings from a large number of investors, allocating society's savings to its most productive use, and diversifying and reducing liquidity and intertemporal risk (see Merton, 1995, Rother, 1999; Levine, 2005; Bajun, 2009; Turner, 2010).

Through these functions the financial intermediaries reduce poverty (Merton and Bodie, 1995; Levine, 1997). By extending credit, financial intermediaries enable consumption smoothing, capital investments and risk management, which reduces poverty in poor households (Shaw, 1973). The impact of the credit channel in reducing poverty is dependent on the relationship that the financial intermediaries with their debtors (Petersen and Rajan, 1994). The credit channel is only effective to poverty reduction through consumption smoothing and capital investments only if the poor people can have access to credit at reasonable cost (Claessens and Perotti, 2007; Inoue and Hamori; 2016). By eliminating the credit constraints of the poor the financial intermediaries increase the productive efficiency of the poor households thereby reducing poverty (Inoue and Hamori, 2012).

However if the credit extension is reckless, the credit channel can contribute to financial fragility which is detrimental to the poor more than their richer counterparts (Jeanneney and Kpodar, 2011; Rewilak, 2017). This coincided with Uddin (2014) assertions that the greater availability of credit does not necessarily benefit the poor. Due to lack of collateral and documents that are required by the formal financial intermediaries, the poor do not adequately participate, adopt and use formal financial products and services (Kirkipatric, 2000; Aguera, 2015). Furthermore if the imperfect markets (discussed in Chapter 2) persist there is no convergence of the incomes of the rich and the poor households in the long run suggesting that financial

intermediation will not reduce income inequalities (see Galor and Zeira, 1993; Barnejee and Newman, 1993). This was further supported by Clarke, Xu and Zou, (2006) in that, indivisibilities in the financial markets will not reduce inequalities. The initial distribution of wealth has a role to play in the long run for the convergence of incomes of the rich and the poor households (Greenwood and Jovanovic, 1990).

Hypothesis 3: There is no causal relationship between poverty and financial intermediation selected developing countries.

Rajan and Zingales (2014) argue that it is inadequate for any research to only establish the correlations between variables; effective policy studies should examine the causal relationships. In this regard, the study seeks to examine the causal links between financial intermediation and poverty. According to Lucas (1988) the financial system develops as the need for the financial products grows. Rajan and Zingales (2014) argued that healthy and competitive financial markets are particularly an effective instrument in distributing opportunities and fighting poverty. Financial intermediation is conducive for poverty reduction but the instability that is accompanied by deep financial markets is detrimental to the poor (Akhter and Daly, 2009). Financial instability affects the poor more than the rich in that for any distortion in the financial markets, the poor lack the ability for asset diversification and reinvest their savings in foreign banks (Jeanneney and Kpodar, 2011). In addition, instability in the financial sector distorts the prices of goods and services and the poor are most affected by the price distortions (Easterly and Fischer; 2001; Dollar and Kraay, 2002). Above all, in financially fragile periods banks ration small loans as they have higher transactional cost and are less profitable for the bank and the poor are affected more by this credit rationing (Stiglitz and Weiss, 1981, Jeanneney and Kpodar, 2011; Rajan and Zingales, 2014).

Available literature on the role of finance in poverty (see for example Demirgüç-Kunt and Levine, 2009; Donou-Adonsou and Sylwester, 2016; Rewilak, 2017) that all focus on the association of finance and poverty and none of these focused on the causal links. Although Odhiambo (2009) and Perez-Moreno (2011) argued on the causal links both studies did not consider the other dimensions of finance such as access and efficiency as explanatory variables. Claessens and Perroti (2007) argued that the lack

of access to financial services contributes to persistent inequalities in developing countries. Financial intermediaries can have a dual effect on poverty in economies with underdeveloped financial markets (Loayza and Rancière, 2006). For example in financially fragile economies which are prone to financial instabilities poverty level can be worsened by financial intermediation expansion and the services offered during this expansion (Loayza and Rancière, 2006; Uddin, Shahbaz, Arouri, and Teulon, 2014, Allen et al., 2016). Poor monitoring and reckless lending by financial intermediaries during periods of expansive real sector can result in worsening of poverty incidences as the lending ability of financial intermediaries to profitable projects is compromised (Dehejia and Gatti, 2005).

In separate studies, Odhiambo (2009; 2010) observed the causal links between finance and poverty in Zambia and Kenya respectively. Furthermore, Ho and Odhiambo (2011) observed a bidirectional causal link between financial intermediation and poverty in China. This was different to the finding of Perez-Moreno (2011) who found a unidirectional causal link between financial intermediation and poverty and the reverse did not hold for a study of thirty-five developing countries. The study found that finance causes poverty in certain periods of the study, commenting that other factors such as political and social factors affected the causal links (Perez-Moreno, 2011). Using different proxies for financial intermediation such as broad money supply (M2), domestic credit to the private sector and, Khan, Ahmad and Jan (2012) observed that the results were sensitive to the proxy used for financial intermediation. This view is similar to that of Odhiambo (2009) who argued that the results of finance poverty nexus are sensitive to the selected proxies.

The direction of causality between financial intermediation and poverty is crucial for policy as the financial sector is regarded as the epitome in the distribution of the economic resources. In a discussion where the finance-poverty nexus is not direct but the one working through economic growth, Levine (1997) argued that the financial sector is a predictor of future economic growth. The economy follows the growth of the financial sector, and the financial sector distributes the benefits of growth in the economy benefiting the poor (Levine, 1997). However, this argument on the indirect role of financial intermediation in poverty reduction via economic growth is not the main argument of this study. This study explores the direct channels of causality between

financial intermediation and poverty. To the best of this researchers' knowledge, all the studies that are available that examine the direct link of finance and poverty incorporating all the four dimensions of finance (depth, access, efficiency and instability) (Rother, 1999; Rewilak, 2017), none has examined the causality effect between financial intermediation and poverty. The examination of the causal relationship between financial intermediation and the other financial dimensions is the contribution of this study to the literature on finance and poverty. That is the gap in literature that the present study seeks to fill.

4.2 Chapter Summary

This chapter has stated and also discussed the three main hypotheses for the present study namely that, (i) Poverty is a function of financial intermediation and the selected control variable of the study. (ii) Cointegrating and short run relationships exist between poverty and financial intermediation and the control variable of the study. (iii) There is no causal link between poverty and financial intermediation. Thus besides seeking to provide the deterministic relationship between financial intermediation and poverty, this study also examines the cointegration and the short run relationships. Further, the causal links between the variables under study are ascertained. The concepts discussed in these hypotheses provide a link between the literature reviewed and the next chapter that delves into the methodology of the study.

CHAPTER 5

METHODOLOGY

5. Introduction

The previous chapters have delineated the hypotheses and review of literature of the study. This chapter aims to flesh out the methodology of the study. As illustrated in the reviewed literature, different methodologies yield different results on the relationship between poverty and financial intermediation. Moreover, given the numerous methodological approaches used in previous studies in determining the relationship between finance and poverty, this chapter reports on the identification and an explanation of the methodology most suited for this study. For that reason, this chapter benefits from methods that have previously been used in other studies and develops a suitable methodology for this study. As discussed below, the elected methodological approach of this study is quantitative and therefore benefits from using numerical and statistical data to decipher meanings and nuances.

5.1 Research design and paradigms

The study will follow a quantitative approach by analysing existing numerical data on poverty and financial intermediation to address the research objectives (see Saunders, Lewis and Thornhill, 2012). A quantitative approach is adopted in order to “establish, confirm, or validate relationships and to develop generalizations that contribute to theory” (Leedy and Ormrod: 2001:102). Descriptive statistics and panel data methodologies (for example GMM, FE, RE and the Pooled Mean Group) are used to determine the relationship between the poverty and financial intermediation including the selected control variables for the study. Furthermore the cointegration and causal links are examined by using the panel ARDL and the panel error correction model. The ARDL and ECM are used to examine the long run relationships amongst the selected variables and to analyse if any changes in financial intermediation explains poverty levels in the sample of the study and vice versa. In support of the quantitative nature of the study the positivist and deductive research paradigms are adopted (see Krauss, 2005; Saunders et al., 2012).

The research design links the research problem and objectives discussed in chapter 1 to the relevant (and attainable) empirical component of this study. This concurs with the assertion of Yin (2002: 21) that research design is a logical sequence linking the empirical data to a study's initial objectives and its ultimate conclusion. The methods and techniques for collecting and analysing data on determining the relationship between poverty and financial intermediation are outlined in the research design. Alternatively, research design enunciates the type of data needed, the methods used to analyse the collected data, and how the data and the methods answers the research problem (Phillliber, Schwab, and Sloss, 1980; Saunders et al., 2012). Subsections 5.1 to 5.9 provide a framework for data collection and the statistical analysis that addresses the stated objectives in chapter 1. Furthermore this research outlines the ethical issues and the limitations that are encountered in the whole research process as described by Saunders et al. (2012). According to Kuhn (1962) and Creswell (2014) 'research paradigm' represents a certain worldview that constitutes the researcher's beliefs, values and methodological assumptions. This worldview is the perception, logical thinking or a set of common beliefs that enlightens the significance or analysis of research data (Lather, 1986; Mackenzie and Knipe, 2006).

Positivism was defined by Krauss (2005) as capturing information by quantifying a phenomenon where statistics and mathematical procedures are used to predict, describe and explain a pattern. The collected data in the sample of the study is analysed using the Stata 15 and Eviews 9 statistical packages to determine and examine the relationship between poverty and the explanatory variables of the study as describes in subsection 5.5. In positivism, the theory discussed in chapter 2 is used to draw hypotheses (discussed in chapter 4) and deductions during the research process and the researcher is independent of human interest within the study (see Carson, Gilmore, Perry and Gronhaug, 2001; Ramanathan, 2008; Crowther and Lancaster, 2012). Positivism incorporates a scientific technique of investigation where observations are interpreted using facts or measurable entities (Kaboub, 2008). Alternatively in positivism the postulated theory is tested using empirical data (see Bhattacherjee 2012: 35).

The secondary data collected is unambiguously analysed for the determinants of poverty using literature as the basis fulfilling the positivist paradigm of the research.

Furthermore the cause and effect relationship of poverty and financial intermediation is proposed with provisions of making predictions using measurable outcomes as the construct of positivism is adopted (see Cohen, Manion and Morrison, 2000; Kaboub, 2008). Cohen et al. (2000) suggested a set of foundational assumptions used in positivism construct namely: determinism, empiricism, parsimony and generality.

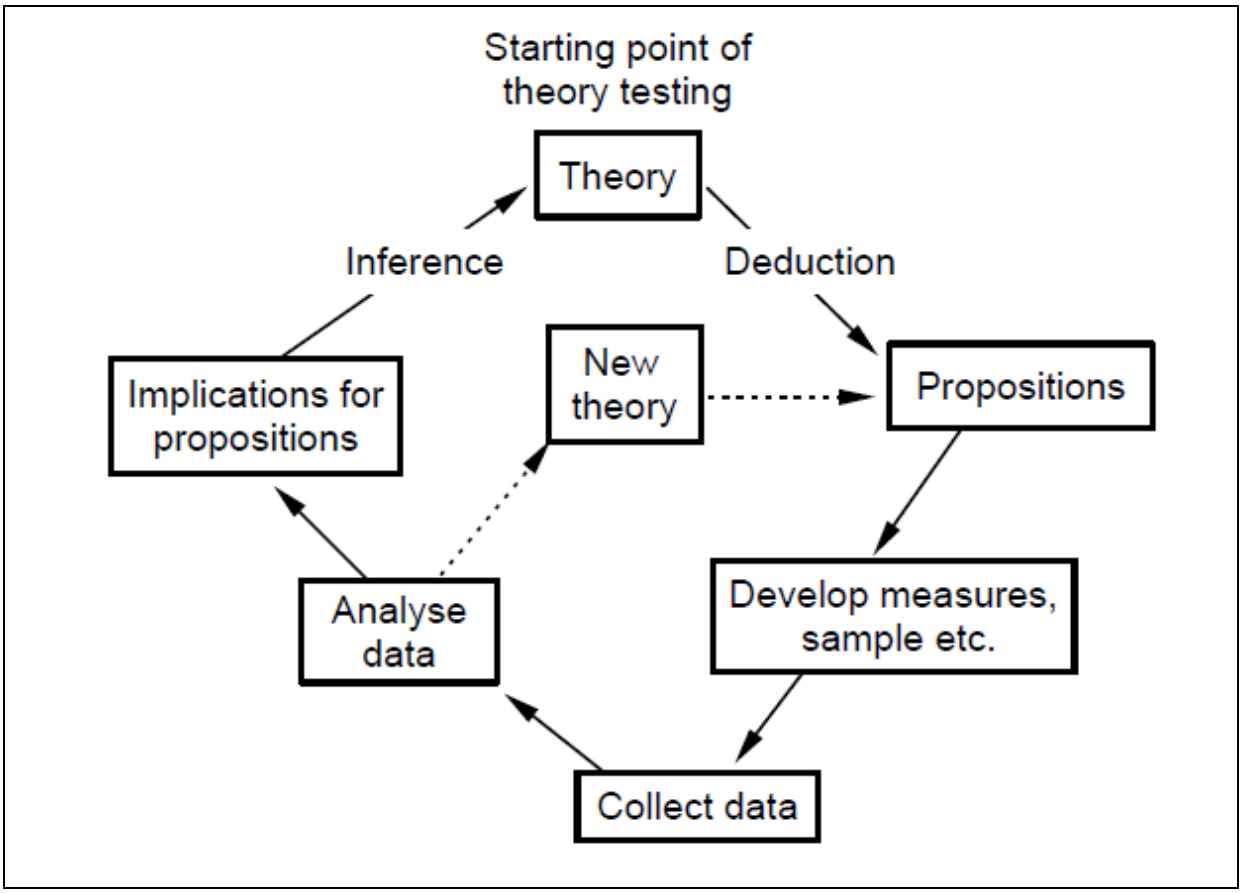
Determinism assumes that the events we observe are caused by other factors of which these causal links can be uncovered and understood (Cohen et al., 2000: 10). Incorporating the determinism, the study seeks to determine if there is any relationship between poverty and the explanatory variables selected. Using empiricism Cohen et al. (2000: 10) and Creswell (2014) argued that research problem is investigated by collecting verifiable empirical data to support the chosen theoretical framework which enables the researcher to test the developed hypothesis for the study. On the other hand parsimony orates that phenomena must be explained in the best economical technique possible (Cohen, 2000: 10).

In this regard an appropriate methodology for the collected quantitative data from verifiable sources is chosen to answer the research objectives for the study. Lastly, generality argues that the study can be applicable elsewhere in the world (Cohen, 2000: 10). In support of the explained positivism paradigm assumptions, an empirical analysis for the study uses secondary data as it is financially economical. Furthermore the use of credible data sources for data collection means that the study can be replicated elsewhere. As will be explained in the methodologies used for this study the determinism is addressed as the study seeks to examine and determine the relationship and the causal effects between financian intermediation and poverty.

In conjunction with the positivist paradigm a deductive paradigm is also incorporated in the study. According to Krauss (2005) a deductive approach is when data is used to test theory of which Saunders et al. (2012) opines that data is used to test the developed conceptual framework in a deductive approach. Additionally Wilson (2014: 119) argued that in the deductive approach hypothesis is developed using the existing theory. The hypotheses discussed in chapter 4 were developed using the theory discussed in chapter 2. Furthermore this chapter develops a research strategy to test the hypotheses that were developed in Chapter 4 (see Wilson, 2014: 122). Robson

and McCartan (2016) agreed that a deductive approach is adopted where pre-existing theoretical philosophies are tested. Figure 5.1 illustrates the deductive approach in a research process.

Figure 5.1: The summary of a deductive research process



Source: Gray, 2013

Figure 5.1 is a summary of the deductive research process which was adopted for this study as the study started by reviewing the existing literature. We further developed hypotheses as our propositions in based on the reviewed literature in which measures of poverty, financial intermediation and the control variables of the study. Bhattacherjee (2012) and Wilson, (2014) opines that these propositions are empirically formulated hypothesis indicating the cause-effect relationships between variables of the study The study then select a sample from developing countries in Africa and Asia where random selection was done using data availability as the benchmark for selection of countries in the study. Data is then collected and analysed where the data can either validate or refute the hypotheses developed in Chapter 4. The performed data analysis provides the implications of the hypothesis supported with statistical

inferences as illustrated in Figure 5.1. The inferences either confirm or reject the theories and concepts which were discussed in Chapter 2.

5.2 Data

Secondary data which is defined as the data that already exist (Andrews, Higgins, Andrews and Lalor, 2012) is used for this study. The study uses the secondary data due to the financial constraints as the collection of such data is cheap and economical (see Corti and Thompson, 2006; Saunders et al., 2012). For the purpose of this study annual panel data is employed. The data is collected from World Bank and the International Country Risk Guide (ICRG). The study focuses on the selected developing countries in Africa and Asia mainly on data availability for the selected countries. Hence panel study is employed and it is comprised of time dimension (T) and the cross section dimension (N) (Im, Pesaran and Shin, 2003). In panel data a variable y_{it} is observed for cross section units i = 1…… N and the time periods t = 1…….T. The type of the panel that the study utilised is a balanced panel in that each panel contains the same number of observations and contains the same time points (Arellano and Bond, 1988). The data used is annual data from 2004 to 2016. The time dimension was specifically chosen based on the data availability mainly on the dimensions of financial intermediation such as access. Prior periods do not have consistent data on the financial intermediation dimension. As highlighted in the literature review, financial intermediation has poverty reducing effects through the functions of financial intermediaries in which the poor people have access to these function (Claessens and Perroti, 2007).

5.3 Population and Sampling

According to Burns and Grove (2003:234); Zikmund and Babin (1997:471), the population encompasses all the fundamentals that can be included in the research project. In this study, financial sector will be the population for the study in which the banking sector is selected as the sample to represent financial intermediaries. The study focuses on the banking sector for the sample of the study as stock markets in most African economies are underdeveloped (Gries, et al., 2009; Samargandi et al.,

2015; Svirydzenka, 2016). Efforts were made to collect data on the stock market and the bond market but very few countries have active stock market and publicly available data.

Bank loans are the prime source of external finance in most countries (see Gorton and Winton, 2003; Gries et al., 2009). This assertion has guided the selection of banks as a representative sample for financial intermediaries. Additionally, stock market is not really active in some of the developing countries. Hence the data on the stock market for the panel of countries is not available. From a population of fifty-four African countries and forty-eight Asian countries, a sample is drawn from these countries based on the availability of data. The list of the countries included in the study is provided in the appendix. That is the sample is chosen from countries that have better data sources available for the time dimension proposed for this study.

5.4 Data Sources

Poverty data- poverty headcount ratio, poverty gap and the gross domestic product per capita were obtained from the World Bank whilst the Gini index was obtained from the Standardized World Income Inequality Database (SWIID). Financial intermediation data- the ratio of private credit to gross domestic product was used as a proxy for financial intermediation and the data was obtained from the World Bank database. Financial access- data was obtained from the Financial Access Survey (FAS) of the IMF. Financial Stability- The study used the bank Z-score to measure financial stability and the data was obtained from the Global Financial Development database (GFDD) of the World Bank. The World Bank database was used to extract inflation data.

Institutional quality data- Three indicators from the ICRG group were used for measuring institutional quality namely, (i) law and order- From the ICRG this measure combine two components that is law and order where law element reveals the power and independence of the legal system whilst the order component assesses the popular observance of the law, (ii) democratic accountability- measure the responsiveness of governments to the people and (iii) bureaucratic quality- which embodies independence from political influence, power and the know-how to govern without severe changes in policy, disruptions in public services and existence of an

established procedures for recruitment and training. Remittances- Remittances inflow as a percentage of gross domestic product and the data was obtained from obtained from the World Bank. Domestic public debt- the central government claims as a percentage of GDP the data was obtained from the IMF. The missing data was treated by using three year moving averages.

5.4.1 Data reliability and validity

Credible and reputable data sources as stated in the data sources section and a reputable software (i.e. Stata and / Eviews) are used for the study for an accurate analysis on the relationships within the data (see Leedy and Ormrod, 2014:103). The study uses publicly available data and this has an advantage that the study can be easily replicated and data verified for accuracy thereby ensuring the reliability and the validity of the data.

5.5 Definition of variables

The following sub-sections 5.5.1 to 5.5.6 highlights the definitions of key variables used in this study.

5.5.1 Poverty

The World Bank Report (2000) defined poverty as the unacceptable physiological and social deprivation in human wellbeing. Several indicators have been developed to measure poverty (see Drewnowski, 1977). In absolute terms poverty is measured as the percentage of the population that is below the poverty line (see Sen, 1982) and the World Bank (2000) referred this to as the poverty headcount ratio. According to the World Bank (2000) headcount ratio is defined as the share of the population with income below the national poverty line. This is the definition that has been accepted in the SDGs and it will be adopted for the purpose of this study. The headcount ratio is used as a proxy for poverty as it has been used in other studies (see Inoue, 2018). For robustness other poverty measures such as the poverty gap, Gini coefficient and gross domestic product per capita per capita are used as poverty measures.

A higher headcount ratio indicates higher poverty level in a country at any given time (Inoue, 2018). Furthermore in absolute terms poverty is measured as the cumulative deficit of income of all the poor from the specified poverty-line and this is known as the poverty gap (Drewnowski, 1977). Alternatively poverty is measured as the inequality in the distribution of income (see Sen, 1986) and this is explained under the section 5.5.9 under inequality. Drewnowski (1977) argued that among the many definitions of poverty the acceptable definition that matters is the one that has been defined by to influence policy. The World Bank (2000) reiterated that poverty lines are anchored to the cost of a food bundle based on the predominant general diet of the poor. The World Bank definition of poverty will be adopted for this study as it is the general definition that is adopted for policy making and the SDGs has adopted the World Bank definition of poverty (see Odhiambo, 2009; Beck, 2007).

5.5.2 Financial intermediation

OECD (2007) defined financial intermediation as a *productive activity in which an institutional unit acquires financial assets by engaging in financial transactions on the market and incurs liabilities on its own account*. In this study the ratio of private credit to GDP is used as a proxy for financial intermediation (see Rother, 1999; Jeanneney and Kpodar, 2011; Perez-Moreno, 2011; Beck, et al., 2014a; Zhang and Naceur, 2018). This is a better measure to show how the private agents in the economy have access to financial intermediation or access to loans (Greenwood and Jovanovic, 1990; Banerjee and Newman, 1993; Galor and Zeira, 1993). According to Levine, Loayza, and Beck (2000) this is the closest measure of financial intermediation in relation to functions of financial intermediaries as highlighted in the literature review. The private credit has been a preferable proxy to financial intermediation as it excludes credits by banks and loans to the government and public enterprises (see Levine and Zervos, 1998; Beck and Levine, 2004). There are limitations however on the measure of financial intermediation as there is no direct measure for intermediation neither on the quality of the services provided by these intermediaries (see Rother, 1999). A negative relationship between financial intermediation and poverty is expected as more credit and savings vehicles are available to the poor it is expected to reduce the poverty levels. The other dimension of financial intermediation that will be included in

the study are financial access, financial instability and financial efficiency, these are discussed in sub sections 5.5.3, 5.5.4 and 5.5.5 below.

5.5.3 Financial access

Claessens (2006) defined access to finance as the availability of a supply of quality financial services at reasonable cost. For the purpose of this study access is measured in terms of access to formal financial institutions specifically banks. The access to financial intermediation illustrates the degree to which households and firms have and use of formal financial services and products (Levine, Čihák, Demirgüç-Kunt, and Feyen, 2012). The access in terms of specific financial products offered by the financial sector in this study is not considered as the data in this respect is not easily available. Rather, the access that is considered is the access to the banking services as there is considerable data available in this measure. Access is measured by automated teller machines (ATMs) per 1,000 km^2 and branches of commercial banks per 1,000 km^2 (see Levine et al., 2012; Rewilak, 2017). Prina (2015) found that the proximity of a bank branch to the poor people improves trust hereby improving the take up and usage of formal financial service by the poor households. There are very few studies that look at the impact of access to finance on poverty mainly due to unavailability of data. Svirydzenka (2016) argued the ineffectiveness of large financial systems without enhanced access to a sufficiently large percentage of the populace and firms.

Access of the financial services in this case involves those who have access and use the financial services and those who have access and do not use the financial services (voluntary exclusion). According to the CGAP (2006) policy makers and the managers of financial institutions do not believe that the poor people save money. Access to financial services has a positive effect on the lives of the poor as access to the financial services and products allows the poor to save, smooth consumption and manage their risks (Burgess and Pande, 2005; Collins, Morduch, Rutherford, and Ruthven 2010; Kendall, Ponce and Mylenko 2010). Access is more on the supply side of the financial services whilst the use of the financial services is a demand concept (Claessens, 2006; Kendall at el., 2010). The main proposition on the role of finance in uplifting the

poor is on those who want to use the financial services but do not have access to financial services (involuntary exclusion). Due to moral hazard and adverse selection banks may adjust prices (interest rates) and their willingness to provide credit to certain individuals (Stiglitz and Weiss, 1981) resulting in involuntary exclusions of certain individuals in accessing and using formal financial products (Claessens, 2006).

5.5.4 Financial efficiency

Financial efficiency is defined as how well financial intermediaries facilitates financial transactions at the lowest cost possible (Čihák, Demirgüč-Kunt, Feyen and Levine, 2013; Naceur et al., 2017; Rewilak, 2017). The interest rate spread is used as the measure of efficiency of financial intermediation (see Rother, 1999; Beck, 2007). The expected profit margins determine the decision to provide broader intermediation. The efficiency of financial intermediation is expected to be negatively related with poverty levels. As the financial efficiency broaden the availability of financial product and services to the poor, more people will have access to finance reducing the level of poverty among poor households.

According to Rewilak (2017) financial efficiency captures the cost of intermediation. Prokopenko and Holden (2001) suggested that higher interest spread usually indicates the exclusion of the poor household from the financial system due to the intermediaries' inadequacy to reduce information asymmetries' (Beck et al., 2007). The credit constraints as a result of information asymmetries reduce the efficient allocation of capital by financial intermediaries worsening poverty incidences (Aghion and Bolton, 1997; Galor and Zeira, 1993; Galor and Moav, 2004). Improvements in the efficiency of financial intermediaries reduce poverty hence the relationship between efficiency and poverty is expected to negative. Similar to access the data that is available for financial efficiency is more bank specific than other financial markets for the panel of our study.

5.5.5 Financial stability

According to the World Bank (2005), financial stability is the absence of system-wide incidents where the financial system fails to function adequately (crises). It explains the resilience of key financial institutions and the financial markets in which they operate. In the event that the financial institutions fails to operate within the financial system in which they operate financial instability is experienced. The credit channel that explains the positive effect of financial intermediation in poverty can be reversed if too much credit is extended resulting in bank fragility (Loayza and Rancière, 2006). Bernanke (1983) argued that banking crises disrupts the process of financial intermediation.

Fragility in the financial system increases the likelihood of credit rationing as banks are unwilling to issue new loans (Andrianova, Baltagi, Demetriades and Fielding (2015). Rewilak (2017) argued that the instability of the financial system increases poverty incidences as it inhibits the banks' ability to offer credit during the periods of fragility. The fragility of the financial sector hurts the poor and small businesses most than the middle and the upper income households (Levine et al., 2012). The bank z-score is used in this study as a measure of financial stability. It is a measure of distance to default, comparing bank buffers (capitalization and returns) with probable risk (volatility of returns). Higher z-score, represents a more financially sound financial system in a country. Instability in the banking sector is usually an unintended effect of increased intermediation (Akhter and Daly, 2009).

5.5.6 Gross domestic product per capita (GDPC)

For this study the real gross domestic product per capita is used as a measure of growth and it is given by real GDP (y)/total population (N) (see Odhiambo, 2009). There are limitations in the gross domestic product per capita as a measure of poverty since it does not include other poverty dimensions (see Odhiambo, 2009). However the measure is adopted in this study for robustness. In Dollar and Kraay (2002) and Jeanneney and Kpodar (2011), the gross domestic product per capita is used as a measure of poverty. Other variables such as financial instability affect the effectiveness of the role of finance in poverty reduction in this case the level of the gross domestic product per capita in the economy. However there a limitations that

have been highlighted for using gross domestic product per capita as a measure of poverty in that

- the accounting of in GDPC includes both bad and good meaning any increase in the gross domestic product per capita irrespective of addressing calamities in the economy is regarded as an increase in gross domestic product but it does not necessarily mean the quality of life has improved (Stiglitz, Sen, and Fitoussi, 2009; World Bank, 2017).
- Omission of goods that are produced on the parallel market to the official market. This error for developing countries can be significant as most goods and services are traded on the unofficial market (see Kuznets, 1962; Ivković, 2016).
- It does not include the nature of the distribution of the goods and services. The gross domestic product of an economy can be high irrespective of how it is distributed to the citizen of the respective countries. These weaknesses in GDPC as a measure of economic wellbeing (hence a proxy for poverty) requires an alternative measure of poverty such as the Gini which show the distribution on income in an economy and this has already been discussed under inequality as an alternative measure for poverty.

To overcome these limitations of the gross domestic product per capita as a measure of poverty it was not the only poverty measure that this study has adopted. The other measures of poverty included in this study for the robustness on the analysis include headcount ratio, poverty gap and the income inequality. In most economies despite steady gross domestic product per capita disparities in income inequalities are increasing hence alternative measures that capture the income inequalities such as the gini index are adopted.

5.5.7 Inflation

Inflation is defined as the general increase in the price level usually expressed as an annual percentage rate. For the purpose of the study the consumer price index (CPI)

is used as a measure of inflation. The inflation in the economy can result in monetary instability which is more detrimental to the poor than the rich (see Dollar and Kraay, 2002; Easterly and Fischer, 2001; Jeanneney and Kpodar, 2011, Beck et al., 2004, Inoue, 2018). According to Akhter and Daly (2009) inflation increases uncertainty and it compromises the sustainability of poor households. Most poor people in the developing countries tend to hold their income in cash which is easily affected by high level of inflations (Prokopenko and Holden, 2001). With better access to financial intermediary services such as risk management household can hedge against inflation in period of economic shocks without altering their consumption income (Clarke et al., 2003). As has been argued by Dehejia and Gatti (2005), with better access to financial services there is a decrease in child labour which is a determinant of poverty in most developing countries. Children from poor families engage in child labour than being in school (Dehejia and Gatti, 2005). In this study the expectation in of a positive relationship between poverty and inflation.

5.5.8 Institutional quality

Institutions are defined as humanly formulated controls that natures the interaction between people (North, 1990). According to the World Bank (2016) the quality of institutions has an effect on the poverty reduction either directly or indirectly via economic growth as it has an effect on the income growth of the poor. Thus institutions imposes limitations of the executive powers which can either be formal informal, political or economic (North, 1991; Acemoglu and Robinson , 2013) Furthermore, Easterly (2013) argued that effective public service is a core element of the quality of institutions as legal and political rights without good public services is inadequate especially for developing countries. Resource mobilisation ability of financial intermediaries without quality institutions is inadequate for effective financial intermediation (World Bank, 1997; Levine, Loayza and Beck, 2000; Kaufmann, Kraay and Mastruzzi, 2003; World Bank, 2005) This supported the earlier assertion by Knack and Anderson (1999) that higher values of the index is strongly linked with income growth for the poor than for the overall population.

Cepparulo et al. (2017) argued conflicting results on the role of institutional quality in poverty reduction. In the study it was argued that pro poor finance had no role in countries where institutions work better whilst in countries with weaker institutions finance has more impact on reducing poverty (Cepparulo et al., 2017). For the purpose of this study the International Country Risk Guide (ICRG) variables such corruption, law and order, and bureaucracy quality' are used as a measurement of institutional quality. The principal components analysis (PCA) is used to develop an index for institutional quality using corruption, law and order and bureaucracy quality. The quality of institution fosters the quality and the depth of financial systems (Cull and Effron, 2008; Park and Mercado, 2015; Allen et al., 2016). Weak institutional settings hurt the poor more than the privileged (Rajan and Zingales (2003). Lipton and Ravallion (1995), argued that the quality institutions are a prerequisite for an effective allocation of financial resources by financial intermediaries

5.5.9 Inequality

The inequality is measured by the Gini coefficient (see Deininger and Squire, 1996; Lundberg and Squire, 2000). Sen (1986) opines that poverty index should be based on an income distribution. The World Bank (2018) asserted that income inequality has significant effects to a nation's aptitude to poverty reduction. Kuznets (1955) argued that the distribution of income shows how the economic wealth has been shared between the rich and the poor. This was supported by Dewilde (2008) with the affirmation that poverty is not only measured in income terms but also on the distribution of the income. For robustness on the measures of poverty in this study the inequality (Gini index) also is also used as a poverty measure in this case it is also a dependent variables in the study. The terms Gini index and Gini coefficient are used interchangeably. The expected relationship between inequality and financial intermediation is uncertain it is proposed to be either positive or negative. This is so because improvements in financial intermediation in terms of credit, savings and risk management can have a threshold effect (Zhang and Chen, 2015). The effect of the financial intermediation can contribute to highly unequal societies in the early phases (implying a positive relationship) until to a certain threshold where intermediation

increases with a decrease in inequality (Greenwood and Jovanovic, 1990; Beck et al., 2007; Zhang and Chen, 2015).

The stage of economic development determines the poverty reducing effect of financial intermediation (Claessens and Perroti, 2007). It was argued that with initial phases of financial expansion only the rich have access to financial services which in later stages of development financial services and products are also made available to the greater population including the poor (Greenwood and Jovanovic, 1990; Claessens and Perroti, 2007; Burgess and Pande, 2005). However, Hamori and Hashiguchi (2012) found that deep financial market reduces income inequalities as the poor people are able to access financial services for consumption smoothing, capital accumulation and risk management. Furthermore it an inverse relationship between financial access and inequlity is asserted (Dabla-Norris et al., 2015)

As the banks expand their geographical presence to previously unserved areas income inequality as measured by the Gini coefficient is reduced (Mookerjee and Kalipioni, 2010) Theoretical considerations suggests that the sectorial structure of the economy plays a role in determining the effect of financial intermediation on income inequality (as in Kuznets, 1955; Clarke et al., 2003). According to Anyanwu and Erhijakpor (2010) argued that greater inequality is related with higher poverty in incidences in most developing countries. As economies grows their financial intermediaries inequality decreases as explained theoretically by (Galor and Zeira 1993; Banerjee and Newman, 1993) that financial imperfection perpetuate the unequal distribution of income. The Gini index has been adopted as the measure of inequality as it is the most widely available measure (see Solt, 2016).

5.5.10 Remittances

Remittances have the capacity to transfer the purchasing power among households reducing poverty, smoothing consumption and generally having a multiplier effect through increased spending by households (Ratha, 2003; Inoue, 2018). They are private transfer of money that are transmitted to households by migrant workers domiciled outside of their communities of origin (Adams Jr and Cuecuecha, 2013;

Inoue, 2018). Inoue (2018) argued that remittance inflows in most developing countries are an important financial source for ameliorating poverty conditions. Remittances in this study are the remittances received and are measured as a share of gross domestic product (see Ratha, 2003; Anyanwu and Erhijakpor, 2010). According to the FinMark Trust (2018) in developing countries, remittances are one of the significant products used by the poor for supporting the welfare of family members. Very few studies have used remittances as a control variable in finance and poverty studies. This study, among other predictors, incorporates international remittances which are money send to country of origin by migrant workers (Ratha, 2003; Ratha, Eigen-Zucchi and Plaza, 2016). Together with savings, remittances allows for consumption smoothing by poor households.

The World Bank (2018) asserted that remittances are the second largest fund inflow to developing countries after foreign direct investment competing with foreign aid. International remittances tends to be positively related with income inequality as the international remittances are either inadequate or they disproportionately goes to those that are better off (Rodriguez, 1998; Ratha, 2003). Other studies argues that remittances reduce poverty and income inequality in that it improves the welfare of the households receiving the remittances as they can smooth consumption and invest in human capita such as paying for their children's education(Viet 2008; Gupta, et al., 2009; Olowa and Shittu, 2012; Azam et al., 2016). Inoue (2018) suggested that remittances have both substitution and complementary effect to financial intermediation as they act as an important source of finance for development. Financial intermediaries play a crucial role in remittance transfers or via the savings and risk management initiatives of the received remittance income (Terry and Wilson, 2005; Gupta et al., 2009; Aggarwal, Demirgüç-Kunt, and Peria, 2011). The effect of remittances on poverty incidences is ambiguous hence they can either have positive or negative impact on poverty.

5.5.11 Domestic public debt

According to the International Monetary Fund (IMF) (2018) increasing sovereign debt and the failure to service the indebtedness in developing countries is increasing the poverty level. Domestic public debt is government debt incurred internally through borrowing in the local currency from a country's residents (Christenes, 2005; Kumhof and Tanner, 2005) posits that underdeveloped financial market and institutional imperfections where contract enforcement is weak, government debt is key for the financial intermediation process Under such economies the financial intermediaries holds more government debt compared to private debt as the weak institutional quality increases the risks of holding private debts (Christenes, 2005; Kumhof and Tanner, 2005). Beck and Honohan (2007) and Andrianova et al. (2015) argued that in most developing countries bank credit to government exceeds bank credit to the private sector. However, central government participation in the credit market can result in an increase in interest rate (cost of borrowing) resulting in crowding out of private investments (Andrianova, et al., 2015).

The level of public debt result in crowding out of private investments as lenders can ration credit and reduce the available funds for investment the private sector (Bua, et al., 2014). Alternatively the interest payments of sovereign debt crowds out the social welfare programs by which in turn contributes to poverty reduction (Akram, 2016). According to Dollar and Kraay (2002) fiscal discipline affects a nation's poverty rate. Domestic debt displaces the private investments as the crowding out effect results in the purchase of public debt at the expense of productive investments by the private sector (Broner et al., 2014; Bua et al., 2015). Literature on the role of government debt in reducing poverty levels is very scarce. This has been included in this study as it is considered instrumental in terms of the credit available for investment by the private sector in most developing countries (Kumhof and Tanner. 2005, Andrianova et al., 2015).

Imperfect financial markets and poor institutional framework in most developing countries results in banks holding more sovereign debts to private credit (Reinhart, et al., 2012). Despite the relevance of public debt in the financial intermediation process, the public debt ultimate effect in poverty reduction is not empirically documented. This study therefore seeks to fill this gap by empirically documenting the link between public debt and poverty. As discussed in Chapters 2 and 3, the main function of financial

intermediation process is to the link surplus and the deficit units through savings mobilisation and credit extension. If the government participation in the credit market distorts this intermediation process it can have consequences the capital allocation.

5.5.12 Summary of variable description and expected signs

	Variable	Description	Definition/ proxy	Previous studies that used the variable	Expected sign
Dependent Variable	Poverty	Headcount Ratio	The share of the population living on less than $1.90 a day at 2011 international prices	Beck et al., 2007; Akhter and Daly, 2009 Jeanneney and Kpodar, 2011; Seven and Coskun, 2016; Cepparulo et al., 2017	N/A
		Poverty gap	Mean shortfall from the poverty line of $1.90 per day measured as a share of the poverty line	Beck et al., 2007; Jeanneney and Kpodar, 2011; Cepparulo et al., 2017	N/A
		Gini index/ coefficient	Income inequality	Li, Squire and Zou, 1997; Honohan. 2004; Page, 2006; Claesssens and Perotti, 2007; Mookerjee and Kalipioni (2010); Hamori and Hashiguchi (2012); Zhang and Chen, 2015; Seven and Coskun, 2016, Jeon and Kabukcuoglu, 2018	N/A
		GDPC	Gross Domestic Product per capita in constant term with 2011 PPP	Dehejia and Gatti, 2002; Akhter and Daly, 2009; Seven and Coskun, 2016; Cepparulo et al., 2017; Rewilak, 2017	N/A

Independent variables	Financial intermediation	PCredit/GDP	The ratio credit to the private sector	Dehejia and Gatti, 2002; Beck,et al ,2007; Akhter and Daly, 2009 Jeanneney and Kpodar, 2011; Samargandi et al., 2015; Seven and Coskun, 2016	-
	Financial Access	FA	automated teller machines (ATMs) per 1,000 km^2 and Branches of commercial banks per 1,000 km^2	Kendall, Ponce and Mylenko, 2010; Demirgüç-Kunt and Klapper, 2012; Adenuga and Omotosho, 2013; Inoue and Hamori, 2016; Rewilak, 2017	-
	Financial Efficiency	FE	Interest spread (Lending rate –deposit rate	Levine et al., 2012; Rewilak, 2017	+/-
	Financial stability	FS	Ratio of impaired loans to gross loans	Loayza and Rancière, 2006; Naceur and Zhang, 2016; Akhter and Daly, 2009 ; Levine et al., 2012; Rewilak, 2017	-
	Inflation	CPI	General increase in prices	Cepparulo et al., 2017; Rewilak, 2017	+
	Institutional quality	INS	An index from ICRG measuring law and order, democratic accountability and bureaucracy in governments	Cull and Effron, 2008; Law et al.,; 2013; Park and Mercado, 2015; Allen et al., 2016; Cepparulo et al., 2017	-

	Remittances	REM	Remittances received as percentage of gross domestic product	Gupta et al., 2009; Anyanwu and Erhijakpor, 2010; Aggarwal et al., 2011 Ratha et al., 2016; Azam et al., 2016 Inoue, 2018	+/-
	Public debt	DPD	Central government domestic debt as a percentage of gross domestic product	Christensen, 2005; Bua, et al., 2014; Andrianova et al.	+

Table 5. 1: Summary on variables of the study

5.6 Data analysis plan

A number of econometric methodologies are used for data analysis in this study namely the ordinary least squares, general method of moments (GMM), fixed and random effects, panel autoregressive distributed lags (ARDL), the error correction model (ECM). The estimation results from the panel ARDL and the ECM are used to infer the cointegrating/ long run and causal relationship between the variables. These methodologies are applied to panel data to address the objectives of the study. The theories discussed in this study links the role of financial intermediation in reducing poverty. Each of the methodologies will be discussed in sections 5.8.1, 5.8.2 and 5.8.3.

The methodologies will be employed using panel data analysis to determine the relationship, cointegration and causal links between poverty and selected financial determinants. In arguing the advantage of using panel data Baltagi (1995; 2008) opines that, panel data assumes heterogeneity which is not the case with either time series (T) or in cross sectional studies (N). If heterogeneity is disregarded that is the non-controlling of the individual country specific variables, the misspecification of a model occurs (Baltagi, 2008). Using the panel ARDL for cointegration we employed the procedures of pooled mean group, mean group and the dynamic fixed effects as suggested by Pesaran, Shin and Smith (1997, 1999). These techniques are used for estimating non-stationary dynamic panels where parameters are assumed to be heterogeneous across groups. To determine the best estimator between the techniques we employed the Hausman test.

Panel data improves the efficiency of the econometric estimates in that it gives the researcher a large number of data points, increasing the degrees of freedom and reducing the multicollinearity among the variables of the study (Fujiki, Hsiao, and Shen 2002; Hsiao, Mountain, and Illman 1995; Baltagi, 2008; Hsiao, 2014). The increase in the degrees of freedom allows for the reduction of the gap between the information requirements of a model and the information provided by the data (Intriligator, Bodkin, and Hsiao, 1996; Hsiao, 2003). Another advantage of panel data is the lessening or removal of estimation bias (Intriligator et al., 1996; Hsiao, 2014) as collinearity among explanatory variables is reduced in panel datasets. In cross sectional studies the error term is inclusive of any unobserved country-specific effect and this potentially result in

biased coefficient estimates (Intriligator et al., 1996, Baltagi, 2008). Conversely, in a panel framework, the unobserved country-specific effects are controlled thus reducing biases in the estimated coefficients (Levine et al., 2000). Additionally panel data allows a researcher to analyse a number of vital economic problems using aggregate data that cannot be addressed using cross-sectional or time-series data sets (Baltagi, 2008; Hsiao, 2014). Unlike the cross section studies which would control only for the endogeneity of financial intermediation, panel estimation would allow for the control of endogeneity in all the variables of the study. Moreover considering the cross-country relationship between financial intermediation and poverty, we would like to estimate how financial intermediation within a country over time may have an effect on the country's poverty levels.

5.7 Unit root testing

Non-stationarity of the data is the main challenge with time series data (Dickey and Fuller, 1981). The data in time series studies must be stationary and satisfies the statistical property time independent in the data (see Box, Jenkins, Reinsel, and Ljung, 2016:24). As much as the time series properties of the variables are of interest to the researcher the statistical properties of time-series estimators are essentially contingent to stationary or nonstationary data (Banerjee, 1999; Hsiao, 2014). Hence it is essential to determine the order of integration of the variables prior to estimating using cointegration techniques. The test is performed to ensure that the data do not have higher order integration beyond first order integration I(1) (Pesaran and Smith, 1995; Pesaran, 1997; Pesaran et al., 1999). The ARDL bounds test is centred on the assumption that the variables are I(0) or I(1). Hence the unit root test determines the order of integration of the variables. Pesaran et al. (2001) argued that if the variables are of a higher order integration it results in spurious regressions as the F-statistic cannot be accurately interpreted.

The study employs the panel unit root testing which originates from the times series unit root testing. The panel unit root testing differs from the individual time series unit roots in that the panel unit root considers the asymptotic behaviour of time series dimension (T) and cross section dimension (N) unlike the latter which only considers the time dimensions (Im, Pesaran and Shin, 2003). Rousseau and Wachtel (1998)

asserted that for any cointegrating relationship to exist the series must be non-stationary. Hence the panel unit root tests are performed for diagnostic test to establish the stationarity of the series. The individual unit root tests have no power in panel data sets and this is worsened by small samples (Baltagi, 2008; Hsiao, 2014), hence the standard unit root tests cannot be applied to this study.

Literature suggests several panel unit root tests and no individual test is singled out as the most superior test in panel data sets (see Maddala, and Wu, 1999; Hadri, 2000; Choi, 2001; Levin, Lin and Chu, 2002; Im, Pesaran and Shin, 2003; Bai and Ng, 2004; Moon and Perron, 2004; Breitung and Das, 2005; Pesaran, 2007). Most tests developed on the panel unit root test were an improvement to the assumption on cross section independence (see Pesaran, 2007). First generation panel unit root tests assumed cross sectional independence whilst second generation tests rejects the hypothesis of cross-sectional independence (Hurlin and Mignon, 2007; Pesaran, 2007; Breitung and Pesaran 2008, Hurlin, 2010). Using the first generation tests in the presence of cross section dependence may lead to size distortions and low explanatory power of the test (Baltagi, 2008; Breitung and Pesaran, 2008; Hurlin, 2010).

Due diligence and care on the benefits and drawbacks of the proposed tests is performed by comparing the outcomes of different unit root tests on the data set. A number of unit root test are performed and these tests incorporates both the first generation unit root test and the second generation unit root tests. Levin, Lin and Chu test (2002) (LLC test hereafter) the Im, Pesaran and Shin (2003) (IPS hereafter), Breitung tests, ADF-Fisher Chi-Square and the PP-Fisher Chi-Square panel unit root tests. As compared to the other unit root test the Fisher test can use different lag length although it has the disadvantage that the lag lengths are obtained by Monte Carlo simulations (Baltagi, 2008). However Maddala and Wu (1999) argued that the Fisher test lag selection is applicable to other unit roots.

5.7.1 Levine, Lin and Chu (LLC) test

Levin et al., (2000) articulated that there is limited power in individual unit root tests against the alternative hypotheses and they tend to have persistent deviation from the equilibrium which is serious in small samples. (Levin et al., 2000; Baltagi, 2008). LLC

test (2000) hypothesised that each individual series have a unit root against an alternative of that each time series is stationary as follows

H_0 = each time series contains a unit root

H_a = each time series is stationary

The LLC (2000) suggested the use of the Augmented Dickey Fuller (ADF) unit root test (Dickey and Fuller, 1979; 1981) as the initial point of the unit root testing procedure (Barnejee, 1999; Levine et al., 2000). It hypothesised that the following model

$$\Delta y_{it} = \rho_i y_{i,t-1} + \sum_{L=i}^{p_i} \theta_{i\,L}\, \Delta y_{it-L} + \alpha_{mi} d_{mt} + \varepsilon_{it} \qquad m = 1, 2, 3 \qquad 5.1$$

with d_{mt} indicating the vector of deterministic variables whilst α_{mi} are the corresponding vector of coefficients for model m = 1, 2, 3, p_i is the lag order(Levine et al., 2000). If ρ_i =0 means the *y* process has a unit root for individual *i,* where i= 1,2,3…..N and t is the time period 1, 2, 3…..T. if ρi < 0 y process is stationary around the deterministic part. L is the lag length. The lag order is allowed to vary across individuals (Levin et al., 2002; Baltagi, 2008). Auxiliary regressions are run on equation 5.1 to obtain the error terms which are then standardised. However the test has low power in small samples and it assumes cross section independence (Baltagi, 2008; Barnejee, 2009). Hence for robustness the Im, Pesaran and Shin (IPS) test is also applied in this study.

5.7.2 Im, Pesaran and Shin (IPS) test

Im et al (2003) extended the LLC test and allowed for heterogeneity of the roots across the units. The null hypothesis is that the individual follows a unit root process against the alternative that allows for some but not all to have a unit root process (see Im et al., 2003). The IPS is said to be superior to LLC in small sample sizes (see Im et al., 2003). As highlighted above for robustness the other panel unit root tests such as the ADF-Fisher Chi-Square and the PP-Fisher Chi-Square are performed.

Before the panel ARDL is used the panel unit roots diagnostic test which test for the stationarity of the series is applied (see Im, et al., 2003). The panel ARDL is only used in level or first integration order data. We used the PMG that combines the long run and the short run effects on the variables. As established with the correlation test to

address the relationship between poverty and financial intermediation, correlation does not mean causality hence the causality test is performed. Each of the methodologies that address the objectives of the study is separately discussed in the sections 5.8 – 5.10.

5.8 Econometric model specification

For this study poverty is hypothesised to be a function of financial intermediation and the selected independent variables which were selected guided by literature. Preliminary descriptive statistics and correlation analysis are performed. For determining the relationship between the poverty and the independent variables of the study poverty is specified as a linear function. Equation 5.2 outlines the functional form of the model for our GMM estimation technique.

$$POV = f(FI, FA, IS, FS, INF, INSQ\_INDEX, DPD, REM) \quad 5.2$$

In equation 5.2 poverty is hypothesised to be a function of financial intermediation (FI), financial access (FA), financial efficiency (IS), financial stability (FS), inflation, institutional quality (INSQ_INDEX), domestic public debt (DPD), remittances (REM). On the objective that seeks to examine the deterministic relationship between poverty and financial intermediation the OLS and GMM methods are proposed to address the relationship between poverty and financial intermediation. Section 5.8.1 provides an explanation of these methodologies. In order to test the objective of examining cointegration and the short run relationship between poverty and financial intermediation the panel ARDL is used. If any cointegration is confirmed the short run relationship between poverty and financial intermediation is tested using the error correction model (ECM). The causal links between the variables is inferred from the results usig the significance of the coefficients and the error correction term. These ARDL and ECM methodologies are explained in section 5.8.2 and 5.8.3 respectively. Equation 5.2 can generally be specified in panel data form as in equation 5.3

$$\Delta Y_{it} = \beta_0 + \beta_{1i}\Delta Y_{i,t-1} + \sum_i \lambda_{it}\Delta X_{it} + \mu_i + \Delta\varepsilon_{it} \quad 5.3$$

Where

Y_{it} is the dependent variable into country *i* for time *t*; is the lag of the dependent variable into country *i* for time *t-1;* β_0 denotes a constant term;; μ_i is the time invariant country specific effect, ε_{it} is a random error term for country i for time t.

The model specified in equation 5.3 poses a challenge when estimated using the ordinary least squares (OLS) method. Furthermore using the static panel estimation method such as the pooled OLS, fixed effects and random effects models in estimating equation 5.3 has a possibility of obtaining biased estimates (Judson and Owen, 1999; Gujarati and Porter, 2009). The lagged dependent variable has correlation problems with the error term, and the autocorrelation will lead to spurious results. The data generating process in equation 5.3 is autoregressive and it yields inconsistent estimates from the OLS. Using the pooled OLS to estimate equation 5.3 is constrained by the restrictive assumption of common intercept and slope coefficients for all cross sections (Samargandi et al., 2015). This assumption implies the heterogeneity across individuals is disregarded by this estimation technique. Endogeneity problems also pose a challenge in estimating equation 5.3 using the fixed effects (see Campos and Kinoshita, 2010). On the other hand the random effects assume strict exogeneity in that the model is considered to be time invariant (Arellano, 2003). Hence the panel aspect of the data that distinguishes long run and short run relationships are not utilised by these models (Loayza and Rancière, 2006; Samargandi, et al., 2015).

Thus the problems of endogeneity, measurement errors and specification bias remains if equation 5.3 is estimated using (Pooled OLS, FE and RE) estimation techniques. To address these challenges the system GMM discussed in section 5.8.1 is adopted.

5.8.1 Generalised Method of Moments (GMM)

The generalised method of moments (GMM) is adopted instead of OLS to address the problems of endogeneity and specification errors. The GMM was introduced by Holtz-Eakin, Newey, and Rosen (1988), Arellano and Bond (1991) to address endogeneity and specification errors in panel data which could not be solved by the OLS method. The study therefore adopts the dynamic panel GMM estimator, which creates a matrix of internal instruments to capture the endogeneity of the lagged dependent variable

and the independent variables of this study (see Arellano and Bond, 1991; Arellano and Bover, 1995; and Blundell and Bond, 1998).

The GMM method is used instead of OLS and the generic model estimated is specified in equation 5.4

$$Y_{it} = \alpha Y_{it-1} + \beta X_{i\,t-1} + \mu_i + \varepsilon_{it} \qquad 5.4$$

Where Y is poverty (estimated by the four proverty proxies adopted for this study), X is a matrix of explanatory variables (other than lagged poverty), μ is an unobserved country-specific effect,ε is the error term, and the subscripts i and t represent country and time period, respectively. The nature of the $\varepsilon_{it} = u_t + u_i$. Taking the first difference of equation 5.4 can be parameterised as

$$\Delta Y_{it} = (\alpha - 1)\,\Delta Y_{it-1} + \beta \Delta X_{i\,t-1} + \Delta \varepsilon_{it} \qquad 5.5$$

Bond, Hoeffler and Temple, (2001) argued that the difference estimator GMM removes unobserved time-invariant country-specific properties. However the difference GMM estimator has potential problems of a possibility of autocorrelation, individual specific heteroscedasticity, and omitted variable bias in the model. The differenced error term in equation 5.5 ($\Delta\varepsilon_{it}$) becomes correlated to ΔY_{it} since they error term (ε_{it}) is now included in both variables. As explained earlier the estimates of equation 5.5 using either OLS or FE will be inconsistent and biased as the model is dynamic.

The model is based on first differencing of the data of which the model still retained the problem of correlation between the lagged dependent variable and the error term (Levine Loayza and Beck, 2000; Seven and Coskun, 2016). Additionally as α approaches unit the estimates are meaningless. Consistent with Levine et al. (2000), Jeanneney and Kpodar (2011) and Batuo, Mlambo and Asongu (2018) and to address these problems, a dynamic panel data model is adopted for this study and to address these problems a dynamic panel data model is adopted for this study. To obtain efficient and consistent estimates on the effect of financial intermediation on poverty and sources of poverty the system, GMM model as postulated by Arellano and Bover (1995) and Blundell and Bond (1998) is used. As the study conceptually seeks to

examine the country specific effect of financial intermediation and poverty the removal of the country specific effect by the differenced estimator ignores this country specific effect (Blundell and Bond; 1998). The system GMM combines in a system, the difference GMM estimator regressions and the regressions of the lagged level variables which are incorporated as instrument variables (Arellano and Bover, 1995; Blundell and Bond, 1998). Since the differenced GMM creates a problem of loss of efficiency as the variables are not used in levels, these shortcomings can be addressed by including level equation in the equation (Arellano and Bover, 1995; Blundell and Bond; 1998).

The decision to use the system GMM is validated by performing the specification tests as suggested by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). The Sargan and Hansen tests of over identifying restrictions are performed to test for the validity of the instruments (Arellano and Bond, 1991; Arellano and Bover, 1995). The general model specification under the system GMM is summarised in equation 5.6 as follows

$$Y_{it} = \alpha Y_{it-1} + \beta X_{i\,t-1} + \mu_i + \varepsilon_{it} \qquad 5.6$$

Where Y_{it} is the dependent variable of country i for time t. Y_{it-1} is the lag of the dependent variable, X is a vector of the explanatory variables whilst μ_i captures the time invariant country specific effect. The disturbance term is captured by ε_{it}. In order to estimate equation 5.6 for panel data the study need to determine whether the fixed effects model (FEM) or the random effects model (REM) is the appropriate estimating model. The Hausman test (Hausman, 1978; Hausman and Taylor, 1981) is therefore used to resolute between FEM and REM. The FEM assumes that the individual-specific effect is a random variable where correlation with the explanatory variable is permitted (Arellano, 2003; Baltagi, 2008). On the other hand the REM assumes that the differences across countries are random and uncorrelated with the explanatory variables included in the model (Arellano, 2003; Baltagi, 2008).

The general system GMM equation in 5.3 is therefore parameterised as

$$POV_{it} = \alpha POV_{it-1} + \beta_1 FI_{it} + \sum_{n=1}^{i} \beta X_{i\,t} + \mu_i + \varepsilon_{it} \quad 5.7$$

Where POV_{it} is poverty as captured in this study as Headcount ratio, poverty gap GDP per capita and income inequality for country i at a time period t. this poverty proxies will be individually tested using equation 5.5. FI is financial intermediation. POV_{it-1} is the first lag of the dependent variable for country i at a t-1 time period. The X_{it} is a vector of explanatory variables which include financial access, financial efficiency, financial stability, inflation, institutional quality, public debt (domestic debt) and remittances. The time invariant country specific effects are captured by μ_i whilst ε_{it} the error term.

The GMM models are generally easy to estimate if N is greater than T and likely to produced biased estimates when N is smaller than T (Roodman, 2009). The assumption of homogeneity of the slope coefficients of the lagged dependent variables is likely to produce inconsistent long run estimates in heterogeneous slope coefficients (Pesaran and Smith, 1995; Pesaran, 1997; Pesaran and Shin, 1998; Samargandi et al., 2015). Hence the panel ARDL as discussed in section 5.8.2 is employed for a dynamic panel analysis to determine the relationship between poverty and financial intermediation.

5.8.2 Panel Autoregressive distributed Lags (Panel ARDL)

The study seeks to test for the cointegrating relationships between the variables of the study by applying the autoregressive distributed lags (ARDL) bounds testing approach by (Pesaran, Shin and Smith, 2001). The traditional ARDL estimation is suitable in studies where N= 1 implying single time series studies (Pesaran et al 2001). However when N>1 and T>1 the panel ARDL is a preferred method of estimation. The panel ARDL seeks to determine the cointegrating relationship between poverty and financial intermediation. The ARDL has the advantage that the variables do not need to be of the same level of integration, however, they cannot be of higher order intergration than I(2) (Pesaran, Shin and Smith, 1999). The ARDL also has an advantage that it is applicable to smaller samples and it jointly estimates the long run relationships with short run parameters. Furthermore the ARDL incorporates the long run and the short run effects of the variables in the model (Pesaran et al., 2001). The optimal lag length

is a requirement to calculate the F-statistics when using the ARDL bounds testing approach, Akaike Information Criterion (AIC) and the Bayesian information criterion (BIC)/Schwarz Bayesian Criterion (SBC) are used to determine the optimal lag length. The lag length is chosen using the smallest values of AIC and SBC.

In panel ARDL estimation there is need to establish whether the mean group (MG) or the pooled mean group (PMG) can be used in model estimation (see Pesaran and Smith, 1995; Pesaran et al., 1999). Pesaran et al. (1999) argued that MG is inconsistent as it is not a good estimator when either N or T is small. Prior to the model estimation the hypothesis of homogeneity among the long run parameters cannot be assumed. Hence the Hausman test is used to determine whether the mean group (MG) or the pooled mean group (PMG) is the preferred method of estimation (Hausman, 1978). The main difference between the MG and the PMG is that under MG estimator, separate equations for each cross section (N) are run and the consistent estimators are produced by averaging of parameters of the model (Pesaran, 1999). Contrary, to the MG and the DFE, the PMG estimator incorporates MG estimator characteristics and pools the estimators (Pesaran et al., 1999). Consistency and the independence of the the regression residuals across countries is the essential assumption of the PMG estimation (Loayza and Rancière, 2006).

The PMG permits country heterogeneity in error variances, the short-run coefficients, together with the intercepts, the speed of adjustment to the long run equilibrium values with a proposal of homogenous long run slope coefficients across countries (N) (Pesaran et al., 1999, Loayza and Rnciere, 2006). In this study the financial intermediation is a determinant of poverty. For the purpose of this study poverty is hypothesised to be a function of financial intermediation (including other dimensions of financial intermediation such as access, efficiency and stability), inflation, institutional quality, remittances and the domestic public debt. The following system of equation is estimated to examine the relationship between financial intermediation and poverty is the selected developing economies. The unrestricted panel ARDL system of equations to be estimated is generalised as below

$$POV_{it} = \varphi_0 + \sum_{k=1}^{p} \delta_{it} POV_{i,\,t-1} + \sum_{i=0}^{q} \delta_{2t} X_{i,t-1} + \mu_i + \varepsilon_{it}$$

5.8

Where Y_{it} is the dependent variable and $X_{i,\,t-1}$ is the (k×1) vector of the explanatory variables for group i and μ_i is the fixed effect, k is the studied country with p and q as the lag length (see Pesaran et al., 1999). Equations 5.7 – 5.41 are the proposed model specifications of the ARDL system of equations that are specific for this study.

Equation 5.3 – 5.15 can be reparameterised to the specifics of this study to a system of equations in which the dependent variable (poverty) is proxied by headcount ratio, povgap and Gini and the following system of equations illustrates the proposed model specifications for this study.

$$HCR_{it} = \beta_0 + \beta_{1i}HCR_{i,t-1} + \beta_{2i}FI_{i,t-1} + \beta_{4i}FE_{i,t-1} + \sum_{i=0}^{n}\delta\Delta HCR_{i,t-1} + \sum_{i=0}^{n}\delta_{2t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\delta_{4t}\Delta FE_{i,t-1} + \varepsilon_{it} \quad 5.9$$

$$FI_{it} = \beta_0 + \beta_{1i}FI_{i,t-1} + \beta_{2i}HCR_{i,t-1} + \beta_{4i}FE_{i,t-1} + \sum_{i=0}^{n}\lambda_{1t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\delta_{2t}\Delta HCR_{i,t-1} + \sum_{i=0}^{n}\delta_{4t}\Delta FE_{i,t-1} + \varepsilon_{it} \quad 5.10$$

$$FE_{it} = \beta_0 + \beta_{1i}FE_{i,t-1} + \beta_{2i}HCR_{i,t-1} + \beta_{4i}FI_{i,t-1} + \sum_{i=0}^{n}\lambda_{1t}\Delta FE_{i,t-1} + \sum_{i=0}^{n}\lambda_{2t}\Delta HCR_{i,t-1} + \sum_{i=0}^{n}\lambda_{4t}\Delta FI_{i,t-1} + \varepsilon_{it} \quad 5.11$$

$$HCR_{it} = \beta_0 + \beta_{1i}HCR_{i,t-1} + \beta_{2i}FI_{i,t-1} + \beta_{4i}FA_{i,t-1} + \sum_{i=0}^{n}\delta\Delta HCR_{i,t-1} + \sum_{i=0}^{n}\delta_{2t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\delta_{4t}\Delta FA_{i,t-1} + \varepsilon_{it} \quad 5.12$$

$$FI_{it} = \beta_0 + \beta_{1i}FI_{i,t-1} + \beta_{2i}HCR_{i,t-1} + \beta_{4i}FA_{i,t-1} + \sum_{i=0}^{n}\lambda_{1t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\delta_{2t}\Delta HCR_{i,t-1} + \sum_{i=0}^{n}\delta_{4t}\Delta FA_{i,t-1} + \varepsilon_{it} \quad 5.13$$

$$FA_{it} = \beta_0 + \beta_{1i}FA_{i,t-1} + \beta_{2i}HCR_{i,t-1} + \beta_{4i}FI_{i,t-1} + \sum_{i=0}^{n}\lambda_{1t}\Delta FA_{i,t-1} + \sum_{i=0}^{n}\lambda_{2t}\Delta HCR_{i,t-1} + \sum_{i=0}^{n}\lambda_{4t}\Delta FI_{i,t-1} + \varepsilon_{it} \quad 5.14$$

$$HCR_{it} = \beta_0 + \beta_{1i}HCR_{i,t-1} + \beta_{2i}FI_{i,t-1} + \beta_{4i}FS_{i,t-1} + \sum_{i=0}^{n}\delta\Delta HCR_{i,t-1} + \sum_{i=0}^{n}\delta_{2t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\delta_{4t}\Delta FS_{i,t-1} + \varepsilon_{it} \quad 5.15$$

$$FI_{it} = \beta_0 + \beta_{1i}FI_{i,t-1} + \beta_{2i}HCR_{i,t-1} + \beta_{4i}FS_{i,t-1} + \sum_{i=0}^{n}\lambda_{1t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\delta_{2t}\Delta HCR_{i,t-1} + \sum_{i=0}^{n}\delta_{4t}\Delta FS_{i,t-1} + \varepsilon_{it} \quad 5.16$$

$$FS_{it} = \beta_0 + \beta_{1i}FS_{i,t-1} + \beta_{2i}HCR_{i,t-1} + \beta_{4i}FI_{i,t-1} + \sum_{i=0}^{n}\lambda_{1t}\Delta FS_{i,t-1} + \sum_{i=0}^{n}\lambda_{2t}\Delta HCR_{i,t-1} + \sum_{i=0}^{n}\lambda_{4t}\Delta FI_{i,t-1} + \varepsilon_{it} \quad 5.17$$

Equation 5.16 - 5.24 is the system of equation using poverty gap as the dependent variable.

$$POVGAP_{it} = \beta_0 + \beta_{1i}POVGAP_{i,t-1} + \beta_{2i}FI_{i,t-1} + \beta_{4i}FE_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta POVAP_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\psi_{4t}\Delta FE_{i,t-1} + \varepsilon_{it} \quad 5.18$$

$$FI_{it} = \beta_0 + \beta_{1i}FI_{i,t-1} + \beta_{2i}POVGAP_{i,t-1} + \beta_{4i}FE_{i,t-1} + \sum_{i=0}^{n}\psi_{1t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta POVGAP_{i,t-1} + \sum_{i=0}^{n}\psi_{4t}\Delta FE_{i,t-1} + \varepsilon_{it} \quad 5.19$$

$$FE_{it} = \beta_0 + \beta_{1i}FE_{i,t-1} + \beta_{2i}POVGAP_{i,t-1} + \beta_{4i}FI_{i,t-1} + \sum_{i=0}^{n}\psi_{1t}\Delta FE_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta POVGAP_{i,t-1} + \sum_{i=0}^{n}\psi_{4t}\Delta FI_{i,t-1} + \varepsilon_{it} \quad 5.20$$

$$POVGAP_{it} = \beta_0 + \beta_{1i}POVGAP_{i,t-1} + \beta_{2i}FI_{i,t-1} + \beta_{4i}FA_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta POVAP_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\psi_{4t}\Delta FA_{i,t-1} + \varepsilon_{it} \quad 5.21$$

$$FI_{it} = \beta_0 + \beta_{1i}FI_{i,t-1} + \beta_{2i}POVGAP_{i,t-1} + \beta_{4i}FA_{i,t-1} + \sum_{i=0}^{n}\psi_{1t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta POVGAP_{i,t-1} + \sum_{i=0}^{n}\psi_{4t}\Delta FA_{i,t-1} + \varepsilon_{it} \quad 5.22$$

$$FA_{it} = \beta_0 + \beta_{1i}FA_{i,t-1} + \beta_{2i}POVGAP_{i,t-1} + \beta_{4i}FI_{i,t-1} + \sum_{i=0}^{n}\psi_{1t}\Delta FA_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta POVGAP_{i,t-1} + \sum_{i=0}^{n}\psi_{4t}\Delta FI_{i,t-1} + \varepsilon_{it} \quad 5.23$$

$$POVGAP_{it} = \beta_0 + \beta_{1i}POVGAP_{i,t-1} + \beta_{2i}FI_{i,t-1} + \beta_{4i}FS_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta POVAP_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta FI_{i,t-1}\ \sum_{i=0}^{n}\psi_{4t}\Delta FS_{i,t-1} + \varepsilon_{it} \quad 5.24$$

$$FI_{it} = \beta_0 + \beta_{1i}FI_{i,t-1} + \beta_{2i}POVGAP_{i,t-1} + \beta_{4i}FS_{i,t-1} + \sum_{i=0}^{n}\psi_{1t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta POVGAP_{i,t-1} + \sum_{i=0}^{n}\psi_{4t}\Delta FS_{i,t-1} + \varepsilon_{it} \quad 5.25$$

$$FS_{it} = \beta_0 + \beta_{1i}FS_{i,t-1} + \beta_{2i}POVGAP_{i,t-1} + \beta_{4i}FI_{i,t-1} + \sum_{i=0}^{n}\psi_{1t}\Delta FS_{i,t-1} + \sum_{i=0}^{n}\psi_{2t}\Delta POVGAP_{i,t-1} + \sum_{i=0}^{n}\psi_{4t}\Delta FI_{i,t-1} + \varepsilon_{it} \quad 5.26$$

Equation 5.25 - 5.34 is the system of equation using Gini index as the dependent variable

$$GINI_{it} = \beta_0 + \beta_{1i}GINI_{i,t-1} + \beta_{2i}FI_{i,t-1} + \beta_{4i}FE_{i,t-1} + \sum_{i=0}^{n}\varphi_{1t}\Delta GINI_{i,t-1} + \sum_{i=0}^{n}\varphi_{2t}\Delta FI_{i,t-1} + + \sum_{i=0}^{n}\varphi_{4t}\Delta FE_{i,t-1} + \varepsilon_{it} \quad 5.27$$

$$FI_{it} = \beta_0 + \beta_{1i}FI_{i,t-1} + \beta_{2i}GINI_{i,t-1} + \beta_{4i}FE_{i,t-1} + \sum_{i=0}^{n}\varphi_{1t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\varphi_{2t}\Delta GINI_{i,t-1} + \sum_{i=0}^{n}\varphi_{3t}\Delta FE_{i,t-1} + \varepsilon_{it} \quad 5.28$$

$$FE_{it} = \beta_0 + \beta_{1i}FE_{i,t-1} + \beta_{2i}GINI_{i,t-1} + \beta_{4i}FI_{i,t-1} + \sum_{i=0}^{n}\varphi_{1t}\Delta FE_{i,t-1} + \sum_{i=0}^{n}\varphi_{2t}\Delta GINI_{i,t-1} + \sum_{i=0}^{n}\varphi_{4t}\Delta FI_{i,t-1} + \varepsilon_{it} \quad 5.29$$

$$GINI_{it} = \beta_0 + \beta_{1i}GINI_{i,t-1} + \beta_{2i}FI_{i,t-1} + \beta_{4i}FA_{i,t-1} + \sum_{i=0}^{n}\varphi_{1t}\Delta GINI_{i,t-1} + \sum_{i=0}^{n}\varphi_{2t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\varphi_{4t}\Delta FA_{i,t-1} + \varepsilon_{it} \quad 5.30$$

$$FI_{it} = \beta_0 + \beta_{1i}FI_{i,t-1} + \beta_{2i}GINI_{i,t-1} + \beta_{4i}FA_{i,t-1} + \sum_{i=0}^{n}\varphi_{1t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\varphi_{2t}\Delta GINI_{i,t-1} + \sum_{i=0}^{n}\varphi_{3t}\Delta FA_{i,t-1} + \varepsilon_{it} \quad 5.31$$

$$FA_{it} = \beta_0 + \beta_{1i}FA_{i,t-1} + \beta_{2i}GINI_{i,t-1} + \beta_{4i}FI_{i,t-1} + \sum_{i=0}^{n}\varphi_{1t}\Delta FA_{i,t-1} + \sum_{i=0}^{n}\varphi_{2t}\Delta GINI_{i,t-1} + \sum_{i=0}^{n}\varphi_{4t}\Delta FI_{i,t-1} + \varepsilon_{it} \quad 5.32$$

$$GINI_{it} = \beta_0 + \beta_{1i}GINI_{i,t-1} + \beta_{2i}FI_{i,t-1} + \beta_{4i}FS_{i,t-1} + \sum_{i=0}^{n}\varphi_{1t}\Delta GINI_{i,t-1} + \sum_{i=0}^{n}\varphi_{2t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\varphi_{4t}\Delta FS_{i,t-1} + \varepsilon_{it} \quad 5.33$$

$$FI_{it} = \beta_0 + \beta_{1i}FI_{i,t-1} + \beta_{2i}GINI_{i,t-1} + \beta_{4i}FS_{i,t-1} + \sum_{i=0}^{n}\varphi_{1t}\Delta FI_{i,t-1} + \sum_{i=0}^{n}\varphi_{2t}\Delta GINI_{i,t-1} + \sum_{i=0}^{n}\varphi_{3t}\Delta FS_{i,t-1} + \varepsilon_{it} \quad 5.34$$

$$FS_{it} = \beta_0 + \beta_{1i}FS_{i,t-1} + \beta_{2i}GINI_{i,t-1} + \beta_{4i}FI_{i,t-1} + \sum_{i=0}^{n}\varphi_{1t}\Delta FS_{i,t-1} + \sum_{i=0}^{n}\varphi_{2t}\Delta GINI_{i,t-1} + \sum_{i=0}^{n}\varphi_{4t}\Delta FI_{i,t-1} + \varepsilon_{it} \quad 5.35$$

Where HCR is headcount ratio, POVGAP is the poverty gap and Gini is the Gini index all as proxies of poverty.

FI is financial intermediation

FA is financial access

FE is financial efficiency

FS is financial stability

β are the long run coefficients of the independent variables

δ, φ, λ,Θ, γ are the short run coefficients

ε_{it} is error term with the i and t representing the country and time period respectively.

The lag order (p, q) is selected using the AIC. The lagged variables and the differences variables of the ARDL respectively test for the long run and the short run relationships of the variables.

5.8.3 Error Correction Model (ECM)

After determining the long run relationship between poverty and financial intermediation the study determines the short run effects using the panel based error correction model (ECM) (Pesaran et al., 1999; Apergis and Payne, 2010). The ECM has the advantage that it incorporates cointegration and also captures the short run effects of the variables under study (see Engle and Granger 1987; Engle and Yoo, 1987; Hoffman and Rasche, 1996). If cointegration is found the error correction model (ECM) is performed to determine the shortrun relationships between the variables.

Hoewever in panel ARDL the error correction model is estimated. The generic error correction model that is proposed for this study is therefore specified in equation 5.35:

$$\Delta POV_{i,t} = \alpha_{0,t} + \sum_{j=1}^{p} \beta_j \Delta POV_{i,t-j} + \sum_{j=0}^{q} \phi_{i,j} \Delta X_{i,t-1} + \varphi_{1i} ECT_{i,\,t-1} + \omega_{it} \quad 5.36$$

Where Δ is the first-difference operator; p, q the lag length selected using the AIC

POV is each of the poverty proxies

X is a vector of the independent variables

ECT is the error correction term

α is the constant

β,ϕ, are short run coefficients

φ is the speed of adjustment to the long run equilibrium

ω is the error error term which is assumed to be normally distributed with zero mean and constant variance.

The error correction term coefficient (φ) in the ECM equations explains the speed of adjustment of the system to the long run equilibrium after a shock in the short run. The coefficient of the ECT (φ) is expected to be negative and statistically significant to show how the variables converge to the equilibrium level (Bildirici and Kayıkçı, 2013).

The system of equations for the tri-variate ECM is as specified in equation 5.37 to 5.63.

$$\Delta HCR_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i} \Delta HCR_{i,t-1} + \sum_{k=1}^{q} \beta_{2i} \Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i} \Delta FE_{i,t-1} + \lambda_{1i} ECT_{i,\,t-1} + \varepsilon_{1it} \quad 5.37$$

$$\Delta FI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i} \Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i} \Delta HCR_{i,t-1} + \sum_{k=1}^{q} \beta_{3i} \Delta FE_{i,t-1} + \lambda_{2i} ECT_{i,\,t-1} + \varepsilon_{2it} \quad 5.38$$

$$\Delta FE_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i} \Delta FE_{i,t-1} + \sum_{k=1}^{q} \beta_{2i} \Delta HCR_{i,t-1} + \sum_{k=1}^{q} \beta_{3i} \Delta FI_{i,t-1} + \lambda_{3i} ECT_{i,\,t-1} + \varepsilon_{3it} \quad 5.39$$

$$\Delta HCR_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i} \Delta HCR_{i,t-1} + \sum_{k=1}^{q} \beta_{2i} \Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i} \Delta FA_{i,t-1} + \lambda_{4i} ECT_{i,\,t-1} + \varepsilon_{1it} \quad 5.40$$

$$\Delta FI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta HCR_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FA_{i,t-1} + \lambda_{5i}ECT_{i,\,t-1} + \varepsilon_{2it}$$

5.41

$$\Delta FA_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FA_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta HCR_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FI_{i,t-1} + \lambda_{6i}ECT_{i,\,t-1} + \varepsilon_{3it}$$

5.42

$$\Delta HCR_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta HCR_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FS_{i,t-1} + \lambda_{7i}ECT_{i,\,t-1} + \varepsilon_{1it}$$

5.43

$$\Delta FI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta HCR_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FS_{i,t-1} + \lambda_{8i}ECT_{i,\,t-1} + \varepsilon_{2it}$$

5.44

$$\Delta FS_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FS_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta HCR_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FI_{i,t-1} + \lambda_{9i}ECT_{i,\,t-1} + \varepsilon_{3it}$$

5.45

Equations 5.46 – 5-54 are the proposed specifications using the poverty gap

$$\Delta POVGAP_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta POVGAP_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FE_{i,t-1} + \varphi_{1i}ECT_{i,\,t-1} + \varepsilon_{1it}$$

5.46

$$\Delta FI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta POVGAP_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FE_{i,t-1} + \varphi_{2i}ECT_{i,\,t-1} + \varepsilon_{2it}$$

5.47

$$\Delta FE_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FE_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta POVGAP_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FI_{i,t-1} + \varphi_{3i}ECT_{i,\,t-1} + \varepsilon_{3it}$$

5.48

$$\Delta POVGAP_{it} = \alpha\beta_0 + \sum_{k=1}^{q} \beta_{1i}\Delta POVGAP_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FA_{i,t-1} + \varphi_{4i}ECT_{i,\,t-1} + \varepsilon_{1it}$$

5.49

$$\Delta FI_{it} = \alpha\beta_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta POVGAP_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FA_{i,t-1} + \varphi_{5i}ECT_{i,\,t-1} + \varepsilon_{2it} \quad 5.50$$

$$\Delta FA_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FA_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta POVGAP_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FI_{i,t-1} + \varphi_{6i}ECT_{i,\,t-1} + \varepsilon_{3it} \quad 5.51$$

$$\Delta POVGAP_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta POVGAP_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FS_{i,t-1} + \varphi_{7i}ECT_{i,\,t-1} + \varepsilon_{1it} \quad 5.52$$

$$\Delta FI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta POVGAP_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FS_{i,t-1} + \varphi_{8i}ECT_{i,\,t-1} + \varepsilon_{2it} \quad 5.53$$

$$\Delta FS_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FS_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta POVGAP_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FI_{i,t-1} + \varphi_{9i}ECT_{i,\,t-1} + \varepsilon_{3it} \quad 5.54$$

We also used the Gini index as a measure of inequality and the equation 5.55 – 5.63 is a system of equation for the error correction between poverty as measured by the Gini index and the financial variables (financial intermediation, financial efficiency, financial access and financial stability).

$$\Delta GINI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta GINI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FE_{i,t-1} + \phi_{1i}ECT_{i,\,t-1} + \varepsilon_{1t} \quad 5.55$$

$$\Delta FI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta GINI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FE_{i,t-1} + \phi_{2i}ECT_{i,\,t-1} + \varepsilon_{2t} \quad 5.56$$

$$\Delta FE_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FE_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta GINI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FI_{i,t-1} + \phi_{3i}ECT_{i,\,t-1} + \varepsilon_{3t} \quad 5.57$$

$$\Delta GINI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta GINI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FA_{i,t-1} + \phi_{4i}ECT_{i,\,t-1} + \varepsilon_{1t} \quad 5.58$$

$$\Delta FI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FI_{t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta GINI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FA_{t-1} + \phi_{5i}ECT_{i,\,t-1} + \varepsilon_{2t}$$

5.59

$$\Delta FA_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FA_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta GINI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FI_{i,t-1} + \phi_{6i}ECT_{i,\,t-1} + \varepsilon_{3t}$$

5.60

$$\Delta GINI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta GINI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FS_{i,t-1} + \phi_{7i}ECT_{i,\,t-1} + \varepsilon_{1t}$$

5.61

$$\Delta FI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta GINI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FS_{i,t-1} + \phi_{8i}ECT_{i,\,t-1} + \varepsilon_{2t}$$

5.62

$$\Delta FS_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FS_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta GINI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta FI_{i,t-1} + \phi_{9i}ECT_{i,\,t-1} + \varepsilon_{3t}$$

5.63

From equation 5.37-5.63
α, is the constant
β, short run coefficients
λ, φ, ϕ are the speed of adjustments to the long run equilibrium

For easy of reference and clarity in the methodology the equation of the ARDL and the ECM are presented separately but in Stata the ARDL and ECM are estimated as one equation

5.9 Chapter Summary

This chapter has clarified the elected methodology and research design of the study. The methodologies used in the study are discussed. An explication of the empirical models that are deployed in testing the hypotheses of financial intermediation and poverty is given. The econometric models that are specified seek to provide the ground work for empirically testing the relationship between poverty and financial intermediation. The estimation models are explained as a basis for testing the relationships between poverty and the selected regressors using specified models.

In examining the relationship between poverty and financial intermediation the initial intention was to use the ordinary least squares methods. However the method has severe estimation bias in panel data sets with N cross sections and T time series. The GMM method is considered but however, the assumption of homogeneity in the slope coefficients of the lagged dependent variables poses a challenge of inconsistent long run estimates in heterogeneous slope coefficients. That is if the slope coefficients are not homogenous the method can produce biased estimates. The Hausman test is used to test if the model is a fixed effect model or random effect model. Other advance econometric estimation techniques such as the panel ARDL are used to determine the long run relationships between poverty and financial intermediation. Within the panel ARDL estimation other tests such as the mean group (MG) and pooled mean group (PMG) and the dynamic fixed effects are performed to determine the best estimator for the panel error correction estimators.

Since the data is a panel with a time series dimension it is necessary to examine the stationarity in the data using the unit root method. For robustness of a number of unit root tests such as IPS, LLC, Breitung, ADF-Fisher Chi-Square and the PP-Fisher Chi-Square were applied. Although the ARDL do not necessitate the testing of unit root, it is adequate to employ the unit root test to ensure that there is no higher order integration than the first order integration in the variables. For consistent estimates the ARDL requires that the data should only be in levels I(0) and first order integration I(1). Furthermore the ECM method is used to determine the short run relationships in the data. The ECM is only employed where there is cointegration after the ARDL estimation. Since the data is panel data the ARDL model employed when any cointergration is found will be estimated using the error correction model than the vector error correction. The error correction term which shows the speed of adjustment to the long run equilibrium is expected to be negative and significant. Although these estimations are adequate to establish the relationship between poverty and financial intermediation, the study further examines the causal link between poverty and its determinants using the significance of the long run and short run coefficients and the significance of the error correction term. The following chapter delves into the discussion and interpretation of the results of the research.

CHAPTER 6

DATA ANALYSIS AND DISCUSSION

6. Introduction

This chapter aims to engage in the discussion and interpretation of research results that are presented in the previous chapter. The GMM and the ARDL techniques were used to empirically test the determinants of poverty and the long/short run relationships. Further, the causal effects between poverty and financial intermediation are reported and discussed. The empirical results of the analysed data are reported using the already stated techniques. Since poverty is a dynamic the panel data model is adopted in the study and the results discussed in this chapter are for a dynamic model using short panel. The main aim of this study, as stated before, is to:

- Examine the deterministic relationship between financial intermediation and poverty in selected developing countries.
- Examine the cointegrating relationship between poverty and financial intermediation
- Examine the causality effects between poverty and financial intermediation

The study employs the system generalised method of moments to examine the deterministic relationship between the selected independent variables and the poverty proxies of this study. To examine the cointegration between financial intermediation and poverty the panel autoregressive distributed-lags (ARDL) is employed. After finding the cointegration between the variables the panel error correction (ECM) is used to examine the short run relationships between financial intermediation and poverty. Furthermore, the study employs the pooled mean group approach within the ARDL framework where the long run and short run relationship are jointly estimated. The inference of the causality between the variables in the study will be obtained from the significance of the long run and short run coefficients and the error correction term. The significance of the long run coefficients implies long run causality whilst the significance of the short run coefficients implies short run causality. Furthermore, the

significance of the error correction term is further examined to determine joint causal effects of the financial dimension to poverty.

One of the determinants of poverty was found to be institutional quality. For this study we developed the institutional quality index from law and order, democratic accountability and bureaucracy quality using the principal component analysis. The construction of the institution index as a measure of institutional quality using the PCA is discussed undersection 6.2. Section 6.3 of the chapter presents and discusses the descriptive statistics for variables of the study. The pre-test diagnostics of unit root that are performed before the analysis of the variables are presented in section 6.4. The empirical results of the analysis of the measures of poverty against the determinants of poverty used in this study are outlined in section 6.5. Lastly section 6.6 delineates the conclusion of the study.

6.1 Principal Component Analysis

The study uses the principal component (PCA) technique to generate a single composite index of institutional quality index for the 35 countries in this study. the structure of the variance of a set of variables was modelled using the principal component analysis. There is no consensus in literature on a single measure of institutional quality index hence we applied PCA to come up with a single composite index. The principal component analysis was used for the measure of institutional quality the index was made up of three components which included law and order, democratic accountability and bureaucracy quality. This differs from Cepparulo et al., (2017) who use the arithmetic average of the same variables as a measure of institutional quality. A composite index from PCA was used as it is beeter than independently using individual varialble which might not have reflected and captured the status of the institutional quality of the selected developing countries.

The principal component analysis is used to condense data sets to lower dimensions while retaining ample information of the original sets as possible. Using previous studies (see Cepparulo et al., 2017) the components were identified to come up with

a single component index. The computed Eigen values of the variance matrix to come up with a single institutional quality index using the PCA are presented in Table 6.1.

Table 6.1: Principal Component Analysis for Institutional Quality Index

Component	Eigenvalue	Difference	Proportion	Cumulative
1	1.40872	.462928	0.4696	0.4696
2	.945789	.300296	0.3153	0.7848
3	.645493	.	0.2152	1.0000

Authors own computation using Stata

A composite indicator for institutional quality was created as an independent variable to determine the relationship between institutional quality and poverty in the selected developing countries. This composite indicator is created to reduce over parameterisation and multicollinearity. Furthermore, PCA was employed to reduce the data to lower dimensions whilst retaining as much information from the original data set as possible (see Gries, 2009).

The Eigen values of the correlation matrix of the three separate indicators that compose the institutional quality index are presented in Table 6.1. The first component explains about 45 percent of the variation. The first component has an eigenvalue of more than 1 and it explains 46.96 percent of the maximum variance whilst the second component with an Eigen value of 0.945789 explains 31.53 percent of the variance. The last component with an Eigen value of 0.645493 explains the remaining 21.52 percent of the maximum variance. The components thus have the sufficient information for the institutional quality index as reflected by their Eigen values.

6.2 Data and Descriptive Statistics

6.2.1 Data

A dynamic short balanced annual panel data from 2004- 2016 was used in this study. The data has many individuals (group) and a short time period. The study couldn't extend the time series of the data prior to the year 2004 as the data on the measurements of financial access was not yet available prior to 2004.

6.2.2 Descriptive Statistics

The summary statistics of the variables used in the estimation of this study is presented in this section. The summary of the descriptive statistics for the variables used in this study are presented in Table 6.2. The section discusses the summary statistics of the pooled data on the variables used in the entire sample for this study. Four poverty proxies are measures such as headcount ratio, poverty gap, Gini index and the gross domestic product per capita are used. Table 6.2 is the summary of the descriptive statistics of the study.

Table 6.2: Summary descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
country	455	18	10.11062	1	35
Year	455	2010	3.745776	2004	2016
Hcr	390	0.3865197	0.2369702	0.0034569	0.941
povgap	390	0.1518886	0.1239008	0.0012895	0.636
Gini	452	43.54987	6.497573	32.7	62
Gdpc	455	4451.903	4136.657	577.8607	15914.67
pcredit	455	28.24928	31.62341	1.01723	160.125
ATMs	374	5.416875	11.52236	0	98.44005
Cb	434	2.650476	5.704712	.0213152	44.95105
is	448	7.623939	9.688882	-3.601667	66.89482
inst1	455	3.063187	1.012434	1	5.583333
inst2	455	3.522894	1.212984	1	6
inst3	455	1.358883	0.7972836	0	3
z	448	12.40535	7.796914	-1.30824	44.7768
inf	454	7.576795	6.771693	-3.099781	44.35669
rem	454	2.958784	4.09548	0.000197	31.5034
dpd	455	9.409374	10.63446	0.166575	74.4383

instQ_index	455	2.46e-09	1.000003	-2.07995	2.042197

Notes: Obs= Number of observations; Std. Dev. = Standard deviation. Hcr is the poverty headcount ratio; povgap is the poverty gap; gini is the gini index whoch measures inequality; pcredit is the private credit, ATMs measures the number of ATMs/1000km^2, cb represents the commercial banks/1000km^2 inst1 is law and order; inst2 represents democratic accountability; inst3 is the bureaucracy quality. instQ_index is the created index of institutional quality using PCA

Source: Authors own computation

Table 6.2 presents the descriptive (summary) statistics of the variables of the study over the full sample period (2004-2016). The total number of observation is 455 for variables with full data set. The period covered by this data for the pooled estimation was from 2004-2016 mainly due the available of data on the measures of financial access. The data from the Financial Access Survey (FAS) is only available as from 2004 and the study could not include the period prior to 2004. The study covers 35 countries.

The maximum private credit as a percentage of the gross domestic product is at 160.125 with a minimum of 1.01723. Some of the countries in the study have very low private credit with a minimum of 1.01723. Low private credit implies lack of financial intermediated products and services.

Income inequality as measured by the Gini index in the panel of our study is very high as it has a minimum of 32 and a maximum of 62. The Gini index ranges from 0, when income among the households is the same and 100 when only one household has all the income.

The domestic debt for the panel of the study is very high with a maximum of 74.4 percent of the gross domestic product. Higher domestic debt can mean revenue collected in most of these developing countries is servicing interest on debt. Eventually if the interest payment on debt is too high it crowds out the space to fund economic and social priorities of governments. Furthermore, high public domestic debt implies the government is competing with the private sector for funds and this can result in crowding out of private investment.

The interest rate spread is generally high for the countries that are covered in this study. This means the cost of credit is expensive for the panel of countries in this study

as the maximum interest rate spread is at 66.89 which was realised in Angola during the early 2000. The average interest rate spread is 9.688882 further indicating that bank charges have a higher interest rate for the extended credit. Demirgüç-Kunt and Levine (2000) argues that countries with high bank concentration and no or few credit bureaus have very high interest rate spread. The panel of countries in this study have mainly few large banks in their economies.

The accessibility of the of financial services as measured by the ATMs or commercial banks per 1000km^2 there is lower access to formal financial services as the maximum number of ATMs/commercial banks per 1000km^2 is 98.44005 and 44.95105 respectively. The minimum for ATMs is 0 showing that there are other countries where these services were not available at all.

The maximum rate of inflation is 44.35669 with a minimum of -3.099781. Inflation shows the ability of the economy to stabilise the price levels. Higher level implies the instability of the consumer prices which can be detrimental to the poor households and small businesses more as they lack the hedging mechanism to downwards risks

The Z-score had a maximum of 44.7768 and an average of 12.40535, a higher z score implies stability in the financial system and it best represents the low risk of financial insolvency of the banking system. According to the World Bank (2016) the stability of the financial system enables the system to allocate resources efficiently and the ability of the banking system to absorb shocks in the event of a financial shock

6.3 Unit root tests

To determine the order of integration of the variables of the study, stationarity tests were performed in order to determine the order of intergration of the variables to carry out regression analysis and cointegration tests. Although the ARDL do not require that the variables be of the same order of intergration, the unit roots were employed for robustness such that no variable that has higher order of integration is included in the regression analysis and cointegration tests. The lag length selection is based on the

AIC automatic lag selection using Eviews 9.5. The lag length selected by the software was between 0 and 1.

Following Granger and Porter (2009) the unit root chosen relied on the power of the test including the test's level of significance (size of test). The probability of rejecting a false null hypothesis is explained by the power of the test. The Levin, Lin and Chu (LLC), Im, Pesaran and Shin (IPS), Augmented Dickey-Fuller ADF-Fisher Chi-square and the Phillips-Perron PP-Fisher Chi-square test were employed in this study. The null hypothesis under all these tests is that the panel contain a unit root, it the p-value is significant the null hypothesis is rejected for the alternative hypothesis that the panel do not contain a unit root. Table 6.3 presents the results of the unit root test LLC, IPS, ADF-Fisher Chi-square and the PP-Fisher Chi-square estimation techniques.

Table 6.3: Unit root Tests

Variable	**No trend**	**Intercept and Trend**	**Trend**	**Decision**
Panel Unit root test using the LLC				
hcr	**-16.3878*** **	**-22.8188*** **	**-19.7426*** **	**I(1)**
povgap	-5.93967***	-9.37869***	-10.0351***	I(0)
gini	-10.6663***	-9.70437***	-8.02836***	I(1)
gdpc	-4.08692***	-13.5273***	-9.75936***	I(1)
pcredit	-13.8969***	-15.4596***	-14.6910***	I(1)
ATMs	-5.19586***	-13.6585***	-14.3276***	I(1)
cb	-5.26442***	-12.9075***	-10.4297***	(1)
is	-4.50351***	-255.717***	-248.125***	I(0)
instQ_index	-40236.8***	-19.3891***	-21.5881***	I(1)
z	-22.4538	-13.8315***	-17.0877***	I(1)
inf	-2.99425***	-11.1959***	-11.1559***	I(0)
rem	-21.3551***	-8.79870***	-9.02607***	I(1)
dpd	-16.5497***	-13.9730***	-13.8827***	I(1)
Panel unit root tests using IPS				
hcr	**-**	**-4.23439*** **	**-10.6001*** **	**I(1)**

povgap	-	-0.70989	-2.45392***	I(0)
gini	-	-5.67646***	-5.21106***	I(1)
gdpc	-	-6.97807***	-6.11692***	I(1)
pcredit	-	-7.65393***	-9.89963***	I(1)
ATMs	-	-2.33941***	-6.42348***	I(1)
cb	-	-4.28029***	-7.62193***	(1)
is	-	-43.0174***	-54.8416***	I(0)
instQ_index	-	-8.16012***	-10.3526***	I(1)
z	-	-6.19248***	-12.0075***	I(1)
inf	-	-5.57631***	-8.20833***	I(0)
rem	-	-10.3124***	-13.4532***	I(1)
dpd	-	-6.52532***	-9.05481***	I(1)
Panel unit root testing using ADF – Fisher Chi-square				
hcr	**306.337*** **	**210.058*** **	**269.169*** **	**I(1)**
povgap	197.882***	98.1730**	104.839***	I(0)
gini	200.422***	151.298***	145.637***	I(1)
gdpc	135.779***	171.613***	159.162***	I(1)
pcredit	293.055***	178.598***	226.784***	I(1)
ATMs	128.364***	133.703***	165.218***	I(1)
cb	132.106***	138.072***	178.300***	I(1)
is	89.1857**	138.418***	200.522***	I(0)
instQ_index	260.045***	145.848***	168.379***	I(1)
z	456.345***	168.414***	260.418***	I(1)
inf	73.9615	151.981***	194.027***	I(0)
rem	461.571***	219.346***	284.468***	I(1)
dpd	347.949***	168.149***	216.948***	I(1)
Panel unit root testing using PP - Fisher Chi-square				
hcr	**387.829*** **	**301.140*** **	**336.279*** **	**I(1)**
povgap	224.006***	164.456***	172.797***	I(0)
gini	254.624***	244.895***	180.434***	I(1)

gdpc	156.455***	205.894***	166.464***	I(1)
pcredit	289.158***	244.724***	237.466***	I(1)
ATMs	134.406***	170.280***	174.590***	I(1)
cb	147.645***	174.885***	207.814***	I(1)
is	118.493***	215.444***	197.316***	I(0)
instQ_index	260.373***	189.937***	194.634***	I(1)
z	458.363***	334.043***	352.592***	I(1)
inf	127.678***	254.537***	191.603***	I(0)
rem	495.472	219.346***	362.281***	I(1)
dpd	380.975***	334.960***	314.252***	I(1)

***; **; * indicates that the null hypothesis of unit root tests is rejected at 1%, 5% and 10%, respectively. All the tests are at first difference (except where indicated otherwise.) Probabilities for all the tests assume asymptotic normality except for Fisher tests which are computed using the asymptotic Chi-square distribution. Hcr is the poverty headcount ratio at the national poverty line, povgap is the poverty gap, gdpc is the gross domestic product per capita, inequality is measured by the gini index, pcredit is the ratio of private credit to the gross domestic product measuring financial intermediation, [ATMs are the automated teller machines/1000km^2, cb are commercial banks/1000km^2 as financial access measures], is-interest rate spread measuring efficiency of the financial sector, z is the bank z score measuring financial instability. Infl is the consumer price index, rem s remittances inflows and dpd is the domestic public debt.

Source: Athours Own Calculations using Stata

Table 6.3 indicates that the variables under study are mostly of first order integration for the entire unit root test employed for the study except for poverty gap, interest rate spread and inflation which were stationary at levels. This section did not discuss the correlation matrix but the test results for correlation matrix have been included in the Appendix 1 for reference.

6.4 Econometric model estimation results, discussion and analysis

To validate the relationship between poverty and financial intermediation the study applied the dynamic panel data estimation for the determinants of poverty. The panel System GMM is used to determine the relationship between poverty and financial intermediation. Separate equations were estimated using different poverty proxies for this study namely (headcount ratio, poverty gap, gross domestic product per capita and gini. Furthermore separate regression equations are estimated using the same poverty proxies for the two proxies of access to finance for the study namely automatic

teller machines per 1000km^2 (ATMs) and commercial banks per 1000km^2 (cb). The panel ARDL is used to determine the long run and short run relationship between financial intermediation and poverty (as measured by the proxies of this study). The individual techniques and results are discussed in sections 6.4.1 and 6.4.2.

6.4.1 System General Method of Moments

The deterministic relationship between financial intermediation and poverty was estimated using the system GMM approach. Three other estimation techniques such as the random effect (RE), the fixed effect (FE) and the Least square dummy variable (LSDV) are presented for robustness checks on the preferred method. The results of these techniques are reported in the appendix. The GMM was the preferred method of estimation due to endogeneity problem in the variables used in estimation (see Roodman, 2009). Additionally the system GMM is more robust to the heteroscedasticity and autocorrelation problems. Poverty is persistent and can pose problems of autocorrelation and unobserved heterogeneity (Wintoki, Linck and Netter, 2012). Furthermore the GMM technique yields an asymptotically unbiased estimation of the t-statistics without requiring the heteroscedastic structure of the regression equation (Hansen, 1982; Blundell and Bond, 1998). The GMM estimation method addresses these problems, thus it was a preferred technique for the deterministic relationship between financial intermediation and poverty. Moreover, GMM is more efficient with short panel type of data (Arellano and Bond, 1991)

The dynamic effects of poverty can render the fixed-effects estimator of panel models biased and inconsistent, particularly for the sample of this study which is finite and have short time periods. From the Hausman test performed the null hypothesis that the random effect is the appropriate was rejected for the alternative hypothesis that the fixed effect model is the appropriate model. To preserve the sample size since the panel on the poverty proxies specifically (hcr and povgap) have got gaps the estimation used the forward orthogonal deviation (FOD). A ‘transformed’ estimation using FOD was used following Arellano and Bover, 1995; Roodman, 2009 and Hayakawa, 2009). The generic dynamic panel model that is estimated in this study is therefore parameterised as in equation 6.1

$$Y_{it} = \alpha Y_{it-1} + X'_{i\,t-1}\beta + \mu_i + \varepsilon_{it} \quad 6.1$$

Where Y_{it} represents the poverty proxies in this study $X'_{i\,t-1}$ represents a vector of poverty determinants including financial intermediation and the control variables selected for this study, μ_i are country fixed effects ε_{it} is the error term with $E(\varepsilon_{it}) \neq 0$ for all i and t

As discussed in chapter 5 differenced GMM could not be used to estimate equation 6.1 as poverty is persistent and the sample for this study is a finite sample with small time period (T) (Alonso-Borrego and Arellano, 1999; Heid, Langer and Larch; 2012). To circumvent the differenced GMM bias in finite sample the study followed Arellano and Bover (1995) and Blundell and Bond (1998) and performed the system GMM. Hence a number of experimentations with the system GMM were performed using different estimation parameters to ensure robust results to the changes of the set of instruments to examine the relationship between financial intermediation and poverty. To the best of my knowledge literature provides no guidance on the cut off points on the number of instruments that should be used in GMM estimation. Ruud (2000; 515) argues that in some cases bias is present even in illustrations where the instruments are few.

The Roodman (2009) rule of thumb that holds that the number of instruments should not be more than the number of groups (35 countries which are the groups) was used as the benchmark for the number of instruments for this study. To ease the instruments proliferation which significantly affected the Hansen statistics, the instruments set was 'collapsed' (see Roodman, 2009). Both the one step and the two step system GMM were performed but only the two step system GMM is reported as it is argued to be more efficient and robust as compared to the one step estimation technique (see Arellano and Bond 1991; Blundell and Bond 1998).

For robustness comparison Appendix 2, 4, 6, and 8 shows the results of the System GMM in comparison with other estimation technique such as the Pooled OLS, Fixed effects etc. for all the proxies of poverty (refer to the Appendix for more details). The Hausman tests rejected the Random effects suggesting the presence of the fixed

effects hence the System GMM model estimated is for a panel with fixed effects. These other technical results which are presented in the appendix 2, 4, 6, and 8 are not discussed in this chapter as the core technique for this study is the System GMM although some reference will be made to the techniques for a robust discussion. In this study two proxies were used as proxies for financial access and they have been estimated separately and the results are presented are presented in Appendix 10-14

The study uses four proxies of poverty and these include headcount ratio, poverty gap, gross domestic product per capita and Gini index. The dynamic panel estimations were performed for all the poverty proxies as linear equations. Since the validity of the instruments is crucial for the reliability of the econometric model, the diagnostics on the validity of the instruments were confirmed by the Sargan and Hansen statistics (Sargan, 1958; Hansen, 1982). The validity of the instruments could not be rejected using the Hansen statistics for all the four models using different poverty proxies. This is vital as the Hansen result confirms that no type II error emanates from pooling valid and invalid instruments. The estimates of the model are consistency as confirmed by the result of first order AR(1) and second order AR(2) serial correlation which were performed using the Arellano and Bond (1991). The AR(1) is reported in the appendix 3, 5, 7, 9 and 11, it is expected that the model can have first order serial correlation. The AR(2) assumes that the explanatory variables are not ‘post-determined’ implying that the independent variables are not correlated with future errors (Roodman, 2017).

The result of the models fail to reject the null hypothesis of no second order (AR(2)) serial correlation and the results are reported in the appendix 3, 5, 7, 9, and 11. The consistency of the estimates also depends on the serial correlation in the error term. The Arellano-Bond test for AR(1) confirms the presence of serial correlation of order one, which is expected, and the Arellano-Bond test for AR(2) provides no indication that the instruments are correlated with the error term. Hence the study cannot reject the null hypothesis of no second order serial correlation in all regressions. As the study did not find second-order serial correlation provides additional evidence that use of lags in this study is valid, and the use of a dynamic model is supported (Akobeng, 2016). Sobiech (2019) opined a benchmark for the reliability of the estimates from GMM results, which asserts that the coefficient of the lagged dependent variable lies between the Pooled OLS and FE estimates. The GMM estimates have satisfied this

reliability and consistence of results benchmarking as shown in the Appendix 10 for all poverty proxies except for lagged Gini index. The result from the Gini index was tested and did not satisfying this suggested benchmarking. For comparison purposes with the other estimation techniques such as the pooled OLS the FE RE and the LSDV-K Appendix 3, 5, 7, 9, and 11 presents the results from these estimation techniques in comparison with the system GMM. The results of the system GMM summarised for all the poverty proxies are presented in Table 6.4.

Table 6.4: System GMM regression results for the determinants of poverty.

	(1)	**(2)**	**(3)**	**(4)**
	hcr	povgap	gini	gdpc
L.Dependent	0.872***	0.859***	1.026***	1.003***
Variables	(7.71)	(8.31)	(97.91)	(49.59)
pcredit	0.000206	-0.0000875	-0.00256*	1.741
	(1.14)	(-0.79)	(-1.81)	(1.19)
atms	0.000163	0.0000867	0.000634	4.563***
	(0.33)	(1.02)	(0.31)	(4.18)
is	0.000584*	0.000917**	-0.00303	0.0574
	(1.74)	(2.08)	(-1.07)	(0.03)
instQ_index	0.00918*	0.00153	-0.0453*	-42.38
	(1.79)	(0.84)	(-1.87)	(-1.85)
inf	-0.000177	-0.000275	0.00206	0.454
	(-0.55)	(-1.47)	(0.93)	(0.31)
z	-0.000541	-0.000552	0.00591*	1.547
	(-0.50)	(-1.14)	(1.93)	(0.54)
rem	-0.00164	0.000114	0.0111*	-0.476
	(-1.37)	(0.17)	(1.86)	(-0.09)
dpd	-0.000133	-0.000184	-0.000151	-0.270
	(-0.46)	(-0.70)	(-0.13)	(-0.15)
_cons		0.0218	-1.207*	-3.000
		(1.02)	(-2.59)	(-0.06)
N	248	283	353	353

Notes: ***, **,* are statistical significance at the levels of significance of 1%, 5% and 10% levels respectively; t statistics in parentheses, p values reported for AR(2) and the Hansen Statistic. The Hansen statistic test for overidentifying restrictions, which is asymptotically distributed as chi2

under the null of instrument validity. hcr is the poverty headcount ratio, pcredit is the ratio of private credit to gross domestic product, ATMs is the automatic teller machines per 1000km^2, is the interest rate spread, instQ_index in the institutional quality index, inf is inflation z is the bank z-score, rem is remittance inflows and the dpd is the domestic public debt. Each column represents a different poverty proxy using the System GMM estimation technique.

Source: Authors' own computations

The diagnostic statistics (F statistic, AR (2) and the Hansen Statistic) in Table 6.4 are satisfactory; the F statistic is significant implying that the independent variables jointly explain the variability in poverty proxies. Roodman (2009) argued that the Hansen statistic is susceptible to weakness and the test becomes weaker with an increase in the moments conditions and Roodman (2009) conceded that it is complicated to satisfy all of them. As explained earlier number of experimentation were performed in order to reduce the number of instruments to improve the Hansen statistic. Poverty as measured with the headcount ratio is statistically significant at 10 percent level to interest rate spread and institutional quality. The significance of the relationship between bank efficiency and poverty is also confirmed by the other estimation methods in the appendix 15, 16, 17 and 18 although the level of significance differs across the estimation methods.

From the results in Table 6.4 different poverty measures related differently to the control variables with respect to significance, the sign and the magnitude of the coefficients.

6.4.1.1 Financial intermediation (pcredit) and poverty

The ability of the financial sector particularly the banking sector to provide financial services to the poor is best captured by the credit channel using the ratio of private credit to the gross domestic product (Rewilak, 2017). The study expected that credit be negatively related to poverty implying that increased intermediation reduces the poverty incidences of low income earners. Contrary to the expectation of a negative relationship between financial intermediation and poverty there is a positive and insignificant relationship for headcount ratio. The gross domestic product per capita is expected to be positively related with financial intermediation implying that an increase in private credit increases the per capita incomes. As private credit best represents the credit channel of financial intermediation, this can possibly be the terms of the

extended credit did not have a poverty reducing effect. These terms may include the credit constraints from formal financial institutions such as collateral and credit history which hinders capital allocation to low income earners. This is contrary to the perception that financial intermediation reduces poverty by reducing credit constraints on the poor. Furthermore, it was observed that the relationship between financial intermediation and poverty depended on how poverty is measured. The results on the effect of financial intermediation on poverty were mixed, showing that the relationship depends on the proxy used to measure poverty.

Financial intermediation has a poverty reducing effect (negative relationship). This was evident when poverty was measured by poverty gap and the Gini index. The relationship is significant at 10 percent only when poverty is measure by the Gini index. The results fail to reject the theoretical consideration of a negative relationship between financial intermediation and inequality as measured by the Gini index. Banerjee and Newman (1993) argued that the optimality of household choices depends on the availability of credit whilst Galor and Zeira (1993) opined that the investment in human capital is contingent to the availability of credit. A unit increase in financial intermediation reduces inequality by 0.00256 percentage points ceteris paribus. Alternatively, a 10 percent increase in domestic private credit reduces poverty by 0.00256 percent all other things held constant. As the credit is made available to the low income earners they are able to smooth their consumption and invest in human capital reducing the level of inequality. The finding of a negative relationship between better financial intermediation and inequality is in line with the findings of Beck et al., (2007). This is in contrast with Dabla-Norris et al. (2015) who found a positive relationship between finance and inequality in developing economies. Policy makers should make careful considerations on how poverty is measured. This will help in the formulation of effective policies that are targeted at poverty reduction. A distortion in the definition and measurement of poverty will have a distortion to the policies that are implemented to address poverty.

6.4.1.2 Financial access (ATMs/cb) and poverty

Financial access is proxied by the automatic teller machines per 1000km^2 and commercial banks per 1000km^2. Other measure The study considered other measures

of financial access (for example ATMs per 100 000 adults, commercial bank per 100 000 adults as reported by the Financial Access Survey but the lack of data for the countries in the panel limited the inclusion of these measures for this study.

From the results only gross domestic product has a positive and significant relationship with access to finance. The positive relationship between financial access and the gross domestic product per capita was expected since an increase in financial access leads to an increase the gross domestic product per capita as the income of households and firms increases. The access to financial products increases the gross domestic product per capita for the households who have access to credit facilities to smooth consumption and venture in the entrepreneurial activities. Increased financial access can increase inequalities and finding that is consistent with Giné and Townsend (2004) in Thailand.

A 1 percent increase in access in turn increases by a percentage of 4.563 in the gross domestic product. This is in contrast with Rewilak (2017) who found a negative relationship between access and the gross domestic product per capita. An increase in access to finance increases the income per capita among households thus reducing poverty as households have more income to smooth consumption (Demirgüç-Kunt and Klapper, 2013). As low income earners have access to financial services, the access to resources such as education can improve the income per capita for a nation (Consultative Group to Assist the Poor, 2012). Deep financial markets do not necessarily mean that the financial services are accessible to the low income earners.

The priori expectations were for a negative and significant relationship between financial access and poverty (headcount ratio, poverty gap and Gini). For this study the relationship is positive and insignificant. The contrary to the finding may be due the nature of our sample of developing countries where there is lack of access and most of the poor and the small businesses mainly use the informal sector. Other factors such as institutional quality which isn't very strong in developing countries can be a constraint on the outreach of banks to the poor (Yoshino and Morgan, 2018). The World Bank (2014: 3) in microfinance experience found mixed results on the role of financial access to poverty. The general consensus was the overextension of credit at higher interest rate in turn increases poverty irrespective of the poor having access to

these services (World Bank, 2014. In there is an increase in access to finance and the access is tilted more to the larger enterprises and the rich the increase in access cannot be beneficial to the poor (World Bank, 2014).

Although there is improved access to finance in developing countries most of the financial products and services are on a top-down approach where services are available but the poor cannot access them because they do not meet their needs. The behavioural responses of the individuals can become an aspect of the relationships between increased access and poverty. Furthermore, when the concentration or market power of banks is brought in the mix the role of access to finance in poverty reduction can be complex. Stiglitz (2017) argued that where there is monopoly power the marginal return on investment is lower than the average return, market power is associated with inefficiency and a distortion in the allocation of resources (Atkinson, 2016). In most developing countries the structure of the formal banking sector is oligopolistic where banks can still have higher profit margins with limited breadth of their services.

Market power cannot be the only driver to higher inequalities, irrespective of increased access to finance if the financial products are too expensive or there exists other barriers to financial access, the increased financial access will be of little value to the unbanked. The nature of the market power affects the distribution of the financial resources such that market power can worsen inequalities (Beighley and McCall, 1975, Stiglitz, 2017). Hence the relationship between financial access and income inequality in economies where banks have higher concentration can be positive. The cointegration and causality between the financial variables is discussed in the later section as access to finance can be influenced by other financial factors such financial intermediation and financial efficiency for it to be of great social and economic value to the poor and small businesses.

With access measured with bank branch expansion (Appendix 10) access to finance has a poverty reducing effect as the headcount is negatively and insignificantly related to access to finance. Furthermore, GDPC and Gini index has a significant positive relationship with access to finance. The significant difference between the two measures of access was that as access in measured by commercial banks Gini became positively significant at 10 percent to the access measure. Although it was

expected that the relationship should be negative as with the headcount ratio and the poverty gap, in this case it is positive. In the developing countries context banks exerts significant monopoly power and access to financial services in not very competitive and lack on infrastructure have centralised the availability of banking services (Tchamyou, Erreygers and Cassimon, 2019). Furthermore, an account at a commercial bank which has fixed costs leads to an increase in inequality to which access to finance initially increase inequality (Greenwood and Jovanovic, 1990). This is because the financial services will only be affordable to certain population groupings widening inequality (Beck et al., 2007; Naceur and Zhang, 2016).

6.4.1.3 Financial efficiency (is) and poverty

It is imperative that the financial sector should be able to deliver financial services efficiently and is normally expected that efficiency of the financial sector is positively related to poverty. In this study the interest rate spread is used to measure efficiency of the banking sector and it is the difference between the lending rate by banks and the deposit rate. The larger the spread the more expensive are bank loans and this reduces their credit allocative efficiency as the credit is too expensive (implying financial inefficiency). The assertion is that efficient banks eases information asymmetry problem and affords savers with better liquidity and risk diversification (Bettin and Zazzaro, 2012). This study covers mostly developing countries in Africa where the interest rate spreads are relatively large meaning higher cost of intermediation (Beck and Cull, 2013). The study found a positive relationship between bank efficiency and poverty which was in contrast with the findings of (Rewilak, 2017). Larger interest rate spreads are mostly common in Africa making intermediation cost very expensive. The results show a positive and insignificant relationship between financial efficiency and the gross domestic product per capita. Financial efficiency is positive significant at 10 percent and 5 percent when poverty is measured the headcount ratio and poverty gap respectively. A 10 percent increase in the interest rate spread increase the poverty headcount ratio by 0.000584 percentage points whilst a 5 percent increase in the interest rate increase the poverty gap by 0.000917 percentage points. Better financial intermediation (lower interest rate spread) reduces poverty by increasing per capita income. Efficient provision of financial products and

services has a poverty reducing effect which is a finding that is consistent with Zhang and Naceur (2018).

Large interest rate spreads limit the expansion of financial intermediation and impedes the effectiveness of the financial sector in lifting people out of poverty (Calice and Zhou, 2018). Wider spreads indicate that the cost of financial intermediation becomes unaffordable for some debtors to use the financial services (Brock and Suarez, 2000; Svirydzenka, 2016). The interest spread is significant at 10 percent and 5 percent for the headcount ratio and the poverty gap respectively. As has been illustrated in Chapter 3, the provision of formal financial services to the poor has been mainly by development banks and aid organisation than the formal financial services (Prokopenko and Holden, 2001). Using the Gini index as a measure of poverty, financial efficiency is negatively related to poverty although it is insignificant. This is in contrast to the relationship between financial efficiency and poverty as measured with the (headcount ratio) and poverty gap.

The results were consistent with theory when poverty is measured by Gini index as the study found a negative relationship with bank efficiency albeit the insignificance of the relationship in this study. The positive relationship can be as a result that as banks efficiency improves in the monitoring and screening of debtors they reject projects with negative present resulting in lower credit extension. Due to lack of collateral to loan applications and non-availability of credit history the low income earners are likely to have their projects rejected. Hence efficiency in this case can result in increase in poverty because there is limited credit issued by the formal banks for investing in entrepreneurial projects that can be a catalyst of investment in human capital and consumption smoothing. Furthermore, efficient financial systems mitigate asymmetric information problems with respect to adverse selection arising before a loan is granted and the moral hazards after the supply of finance. In this way, a highly developed banking sector in a sound regulatory environment ends up boosting saving and capital accumulation and, above all, enhances the efficiency of capital allocation and technological development within the economy. For robustness the regression equations were also estimated using the commercial banks per 1000km^2 as a measure of access and the results are presented in Appendix 10.

6.4.1.4 Financial Stability (z) and poverty

The stability of the financial sector is crucial as it has social and economic ramifications. Financial stability and poverty as measured by the headcount ratio and the poverty gap has a negative and insignificant relationship with bank stability. The gross domestic product has a positive insignificant relationship with bank stability. Akhter and Daly (2009) argued that financial stability/instability is a positive/negative consequence result of financial intermediation. As in Table 6.4, the measures of poverty relate differently to poverty determinants. If active growth in the credit extended to the private sector results in the economy 'overheating' this can have a negative effect on poverty incidences (Afanasyeva, Lee, Modugno, M. and Palomino and 2018). When poverty is measured by the headcount ratio and the poverty gap the relationship with financial stability is insignificant and negative. Micro stability through healthier households and the business sector (improved standard of living) can enhance the stability of the financial system (CGAP, 2012). Instability in the banking sector can lead to banking crises and economic recession accompanied with job losses. Poor households have little headroom to absorb financial shocks. The instability of the financial system can increase poverty, which is a finding that is consistent with Neaime and Gaysset (2018).

6.4.1.5 Institutional Quality (instQ_index) and poverty

Similar to the previous findings the poverty proxies responded differently to the institutional quality variable. The relationship between institutional quality and the inequality is negative and significant as expected. A percentage point increase in the quality of institutions tends to reduce the inequality as measure by the Gini index and quality institutions tend to reduce the income gaps by 0.0453 percentage points. The institutional quality reduces poverty in that if the economy has favourable legal and policy environment with the capacity to cost efficiently address the market failures through sustainable and well-designed interventions poverty is reduced (Yaron, et al., 1998).

The institutional quality is positively related with poverty as and it is significant at 10 percent level in the case of poverty as measured by the headcount ratio. This finding is consistent with Perera and Lee (2013) who found that improvement in the institutional quality (democratic accountability and bureaucratic quality) increases poverty. Referring back to the descriptive statistics (Table 6.2) this variable is fairly constant across the sample for the period under investigation. This might be difficult to observe the effect of an improvement in the quality of the index on poverty. The study concurs with Perera and Lee (2013) that an improvement in institutional quality can be a shock to the system with an effect to increase in poverty levels. Alternatively, for this study we observe that the improvements in the institutional quality index reduces inequality, there might be a trade-off between the reduced inequality and increase in poverty an assertion which was also observed by Andres and Ramlogan-Dobson (2011), Chong and Calde´ron (2000) for developing countries.

6.4.1.6 Inflation (inf) and poverty

The coefficients of inflation were not significant for all the poverty measurements and inflation related differently depending on how poverty is measured. When poverty is measured by the Gini index and the gross domestic product per capita the relationship between inflation and poverty is positive. Although in this study the relationship is insignificant it is in line with literature that inflation increases poverty incidences as it is detrimental to the poor more than the rich (Easterly and Fischer 2001, Dollar and Kray 2002; Neaime and Gaysset, 2018) As measured by headcount ratio and poverty gap inflation had a negative relationship with poverty which is contrary to Zhang and Naceur (2018) who found a positive relationship between inflation and poverty gap.

Literature does not show a clear cut effect of inflation on poverty as it can either be positive or negative (Blank and Blinder, 1985; Romer and Romer, 1998). UN Report (2010) argues that the real wage reducing effect of inflation increase employment opportunities which increase income. In this case inflation can have a negative effect on the poor. Cardoso, 1992 argued that inflation do not have an effect on households below the poverty line as they have negligible cash holdings. Methodological differences and different samples of the study can possibly explain the difference in

finding on the relationship between inflation and poverty between this study and previous studies (see Zhang and Naceur, 2018; Rewilak, 2017).

6.4.1.7 Remittances (rem) and poverty

The role of remittances in poverty reduction is mixed depending on how poverty is measured. For headcount ratio, poverty gap and the gross domestic product per capita the relationship is insignificant. As measured by the headcount ratio the relationship is negative as expected although it is insignificant. Remittances are thought to reduce poverty since they are directly received by the poor households (Adams and Page, 2005). According to the World Bank (2018) remittances in Africa are a major source of external finance providing stable finance more that the official development assistance and the foreign direct investment. The study found out that the effect of remittances on poverty relies on how poverty is measured. From the results poverty as measured by the headcount ratio have a negative insignificant relationship with remittances. The finding contradicts those of Inoue (2018) who found that remittances have a significant poverty reducing effect for a panel of developing economies. Adams and Page (2005) found a negative significant relationship between remittances and poverty and found that remittances might decrease the depth, level, and severity of poverty. The international remittances are thought to have a poverty reducing effect among households that have international migrants. Remittances have the potential of increasing households' income which is in turn used for, smoothing consumption and helping in reducing the capital constraints of the poor and the venturing into entrepreneurial activities. Studies on the relationship between poverty and remittances for a set of developing countries are scarce.

Households that receive international remittances have a lower probability of remaining poor as compared to households who do not receive international remittances. Our results on the negative effect of remittance on poverty can be compared to Anyanwu and Erhijakpor (2010) and Akobeng (2016) although the data frequencies and the methodologies used differ. As measured with the Gini index remittances has a significant positive relationship, a ten percent increase in remittances increases the Gini index by 0.0111 percentage point. The remittances in this case increase inequality a finding which is in contrast to Koczan and Loyola (2018)

who finds that remittances have an inequality reducing effect in Mexico. This finding is however in line with the Adams Cuecuecha, and Page (2008) findings in Ghana that international remittances increases inequality.

Russell (1992) opined that people's choice between formal and informal channels for remitting money relies on socio-economic attributes of members of the household, their nature and degree of economic activity in the hosting countries, the sending charge differentials and relative effectiveness of the formal sector to the informal sector. Formal credit extension to the poor in the developing countries with underdeveloped banking sector countries is a challenge and remittances therefore provides liquidity and ease credit constraints of low income households (Meyer and Shera, 2017).

6.4.1.8 Domestic Public Debt (dpd) and poverty

The study uses the domestic public debt as one of the control variables to examine the relationship between domestic public debt in a financial intermediation setting. The study includes the variable in the analysis since high public debt crowds out private investments. In developing countries, the concentration of the investor base for domestic debt is mainly the concentration of the investor base, mainly dominated by the Central Banks and the commercial banks (Bua et al., 2014). This may render financial intermediation to be ineffective as the lending to the public sector can crowd out private sector lending by the commercial banks (Christensen, 2005)). Although none of the poverty measurements had a significant relationship with the domestic public debt they all have a negative relationship with domestic debt. Increase in domestic debt has a positive reducing effect if the debt is used in improving the welfare of the people.

6.4.2 Cointegration and r Error Correction

This section presents the analysis that addresses the two objectives of the study that is to examine the cointegrating relationship between financial intermediation and poverty, to ascertain if there are causality effects between poverty and the selected financial determinants. The poverty proxies that the study used in the cointegraing

relationship and causality are headcount ratio, poverty gap and the Gini index. Cointegration is ascertained between variables if a long run equilibrium relationship between the variables exists (Awe, 2012). The study therefore found that cointegration exist between the variables and proceeded performing the error correction between financial variables (financial intermediation, financial efficiency, financial access and financial stability as the determinants of poverty) and poverty is tested and discussed.

In examining the cointegrating relationship between financial intermediation and poverty and financial intermediation the pooled mean group estimator in a panel ARDL procedure was the preferred method. The ARDL technique has the advantages that it does not require the variables to be of the same order of integration although for consistency of the estimates the variables should not be of higher order than first order integration I(1). Furthermore, the error correction term ECT is extracted from the panel ARDL estimation to examine the short run characteristics of the relationship between poverty and financial intermediation. Additionally, the significance/insignificance of the short run, long run and the error correction coefficients of panel ARDL explain the causal effects between poverty and its determinants. The panel ARDL can be categorised as the error correction model as it can identify the short run and long run relationships (Attiaoui, Toumi, Ammouri, and Gargouri, 2017).

6.4.2.1 Pooled Mean Group (PMG), Mean Group (MG) or Dynamic fixed effects (DFE)

As has been discussed in Chapter 4 regarding panel ARDL the study needed to determine whether pooled mean group (PMG), mean group (MG) or the dynamic fixed effects (DFE) is the most appropriate estimator for the panel ARDL. The Hausman test was performed to select the most appropriate estimator for the ARDL model and the p-value of the Hausman test is statistically insignificant rendering the PMG estimator is more appropriate. If there is homogeneity of the slope the PMG is the most appropriate estimator and the null hypothesis of slope homogeneity in the long run cannot be rejected if the probability value is more than 5 percent, the study assume that the PMG is the best estimator to use to analyse the panel data. The pooled mean group assumed that the long run coefficients are the same across the group that makes up the sample.

As PMG is the preferred estimation technique the discussion of the results will be mainly from the output of the PMG estimator (Hausman test results are reported in the appendix). The PMG has an advantage over the MG and the DFE in that PMG estimator allows heterogeneity in the intercept, the short run parameters and the error variances between the groups whilst restricting homogeneity of the long-run coefficients among the groups (Pesaran et al., 1999). When the homogeneity of the parameters holds the error term are serially uncorrelated and the long run parameters are homogenous across for all the countries in the panel (Pesaran, et al., 1999; Loayza and Rancière, 2006). Therefore to examine the cointegration between the variables the study used the panel ARDL.

The panel ARDL permits us to examine the long run and short run dynamics of the variables of interest. The panel ARDL is preferable as it also allows us to examine the heterogeneity of the variables of interest across countries in the short run. The study compare these results with those obtained using more restrictive dynamic fixed effects (DFE) methods, and the more flexible, but data-intensive, Mean Group (MG) approach and the output of these results of all the three panel error correction estimators (PMG, MG and DFE are presented in the Appendix 15-44). This section gives emphasis on the results obtained by employing the PMG estimator, as the Hausman test failed to reject the null hypothesis. Furthermore, it will be a preferred estimator due to its benefits in consistency and efficiency over the other panel estimators (see Loayza and Rancière, 2006) The results that were obtained from mean group and the dynamic fixed effects are also presented for comparison purposes and the results are presented in the Appendix section of the study. This section only presented and discussed the results from the PMG estimator.

6.4.2.2 Panel cointegration and the Error Correction Model: Pooled Mean Group (PMG) approach

In this section the study discusses the results of the cointegration and the error correction between the poverty proxies' and the financial dimensions namely financial intermediation, financial efficiency, financial access and financial stability. Each of the financial dimensions is jointly tested with financial intermediation to examine the cointegrating relationship with the poverty proxies. The results presented here used

the pooled mean group which assumes that a long run relationship between poverty and the financial dimensions are identical across countries whilst allowing the short run relationship to be country specific. The coefficients have been verified for the long run homogeneity using the Hausman test as explained in section 6.5.2.1. Tables 6.7-6.9 report the results of PMG estimation of the long-run and short-run coefficients of the financial dimensions and the coefficient of the error correction term.

6.4.2.2.1 Cointegration and Error Correction Model for poverty proxies, financial intermediation and financial efficiency

Table 6.5 summarises the pooled mean group estimates of the cointegrating relationship between the financial dimensions (financial intermediation, financial efficiency) and poverty proxies for the selected developing countries of this study. When estimating the model using financial efficiency as a dependent variable the study dropped Algeria as there was no variability in the data.

Table 6.5: Summary of the Pooled Mean Group on the cointegrating and causality relationship between poverty proxies and financial intermediation and financial efficiency

	(1)	(2)	(3)
	∆.hcr	**∆.povgap**	**∆.gini**
Long run			
pcredit	-0.0000591*	-0.00163***	0.00733**
	(-2.51)	(-19.62)	(2.75)
is	0.0108***	0.00193***	0.0198***
	(125.30)	(8.11)	(8.03)
ECT	-0.437***	-0.493***	-0.208***
	(-6.43)	(-4.64)	(-6.16)
Short run			
∆.pcredit	-0.00179	-0.00152	-0.000871
	(-1.11)	(-1.18)	(-0.23)
∆.is	-0.00523	-0.00433	0.000679
	(-1.14)	(-1.27)	(0.02)
_cons	0.107***	0.0870***	9.223***
	(3.70)	(4.23)	(5.60)
N	321	321	411

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. hcr (headcount ratio), povgap (poverty gap) and gini (gini index) as poverty proxies, pcredit is financial intermediation and is measures the interest rate spread measuring bank efficiency. The xtpmg routine in stata was used for the estimations. The first panel displays the results of the long run effects whist the second panel displays the results of both the error correction term (ECT) and the short run effects. ∆ is the difference operator.

Source: Author's computation

The results from Table 6.5 showed that there is long run relationship between poverty, financial intermediation and financial efficiency. The long run relationship between financial intermediation and poverty as measured by the headcount ratio is negative and significant at 10 percent level. Increase in the financial intermediation in the long run reduces poverty incidences as the low income households access more credit for consumption smoothing or human capital investments. The same result were observed when the study measure poverty with the poverty gap that when financial intermediation is increased, poverty (headcount and poverty gap) is reduced in the long run and the result is significant at 1 percent significant level. The results show that increase in financial intermediation widens the inequality gap in the long run.

There is a significant positive long run relationship between all poverty proxies and financial efficiency. An intuitive expectation was a negative relationship between

poverty proxies and financial efficiency where efficiency in financial intermediation is expected to reduce poverty. Theory has mixed results on the effects of the financial efficiency on poverty incidences as financial efficiency can either have a positive or negative effect on poverty incidences (Prokopenko and Holden, 2001; Rewilak, 2017). Theoretically, financial efficiency is expected to be poverty reducing as the banks are able manage the risk of information asymmetry and reduce transaction costs and make credit available to the poor. It is expected that as financial sector improves efficiency it should result in poverty reduction ceteris paribus. Lower interest rate spreads (better financial efficiency) can significantly reduce poverty in the long run in which this positive significant relationship between financial efficiency and poverty is consistent with the finding by Zhang and Naceur (2018).

Most banks in developing countries have monopoly power and lack of competition enables them to charge higher spreads (Allen and Gale, 2004). Higher spreads discourage participation in the formal financial sector by the poor thereby increasing poverty incidences. Alternatively, higher spread implies that banks are still profitable without increasing a product offering that meets the need of the poor hence the higher spreads have a positive effect with poverty (Zhang and Naceur, 2018). The higher the cost of credit irrespective of it being profitable for the banks hurts the poor in that credit is expensive the availability of credit by the poor households' who often lack the collateral or do not have good credit scoring for banks to advance credit. The role of financial efficiency in poverty reduction to our knowledge is empirically under researched. Hence the cost of credit can be a barrier to participation in formal financial sector by the poor resulting in the failure to unlock human capital that has a potential to reduce poverty. Higher spread mean expensive credit and it hurts the poor whilst lower spread has a poverty reducing effect as the cost of credit is cheaper and the poor and small businesses can be able to access the credit which they can use for consumption smoothing, capital accumulation and risk management.

Additionally, improved financial efficiency by the financial sector implies improved screening and monitoring of loan applications and most likely the loans with negative present value are declined. As most of the low income and small businesses lack collateral their loan application is likely to fall in the category of loan with negative present value and they are denied access to the credit facilities which have a poverty

reducing effect through consumption smoothing and availability of funds to absorb negative shock. However, in the short run the study observed an insignificant negative relationship between efficiency and poverty as measured by the headcount ratio and the poverty gap. As financial efficiency improves in the capital allocation and allows for income generation by enhancing the productive capacity of poor households this can have a poverty reducing effect. Bank inefficiency (higher spread) is accompanied with credit rationing consequently lowering the credit that is channelled to qualifying borrowers, (Stiglitz and Weiss, 1981, Bester, 1987; Beck, 2007). Financial intermediation and financial efficiency can jointly explain the level of poverty in that if the credit is rationed and not all borrowers have the access to the financial services and products inequality can increase. This study found that in the presence of financial efficiency financial intermediation increases inequality in the long run (Table 6.5).

The error correction term is negative and significant under the preferred PMG estimator. Poverty as measured with the headcount ratio adjusts to changes in financial intermediation and financial efficiency to its long run equilibrium at a speed of adjustment of 43.7 percent whilst is poverty is measured by the poverty gap it adjust to its long run equilibrium at an adjustment speed of 49.3 percent. The Gini index adjusts at a speed of adjustment of 20.8 percent to any shocks to financial intermediation and financial efficiency.

All the poverty proxies have a significant long run relationship with financial intermediation, and financial efficiency. Zhan and Sherraden (2011) asserted that improved accumulation of financial assets among the low income earners has a poverty reducing effect as increase intermediation of the financial services allows for consumption smoothing and improved standard of living. All poverty proxies are significantly related to financial intermediation in the long run where the poverty is measured by the headcount ratio and the poverty gap is reduced as financial intermediation increases. However as measured with the Gini index an increase in financial intermediation increases the Gini index (inequality). The relationship is positive and significant at 5 percent. The relationship between poverty proxies and financial efficiency is positive and significantly related at 1 percent level for all the poverty proxies for the selected developing countries.

The insignificance of the p-values for all the proxies in the short run also implies that there is no short run cointegration. However, for all the proxies the error correction term is negative and significant as expected. For all the proxies of poverty there is a long run cointegration among the variables at 1 percent significance level. Any deviations from the long run equilibrium are corrected at the speed of adjustment of 43.7 percent, 49.3 percent and 20.7 percent for poverty headcount ratio, poverty gap and the Gini index respectively.

6.4.2.2.2 Cointegration and Error Correction Model for poverty proxies, financial intermediation and financial access

This section discusses results presented in Table 6.6. These are results of the cointegrating relationship between financial intermediation, financial access and the poverty proxies.

Table 6.6: Summary of the Pooled Mean Group on the cointegration of poverty proxies and financial intermediation and financial access

	(1)	(1)	(3)
	hcr	**povgap**	**gini**
Long Run			
pcredit	0.000316***	-0.00107***	-0.106***
	(4.02)	(-6.54)	(-15.92)
cb	-0.0536***	-0.00804***	0.0910
	(-41.33)	(-4.67)	(1.53)
ECT	-0.454***	-0.579***	-0.144***
	(-5.12)	(-5.57)	(-2.87)
Short run			
∆.pcredit	-0.000706	-0.000609	0.0226
	(-0.41)	(-0.31)	(0.86)
∆.cb	-0.0618	-0.112	-0.208
	(-0.49)	(-1.10)	(-0.27)
_cons	0.210***	0.111***	6.303**
	(4.38)	(4.95)	(2.79)
N	271	271	313

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. hcr (headcount ratio), povgap (poverty gap) and gini (gini index) as poverty proxies, pcredit is financial intermediation and cb measures the financial access. ∆ is the difference operator.

Source: Author's computation

From Table 6.6, the relationship between bank branch expansion and poverty as measured with the headcount ratio is negative. This is in line with the survey experiments findings by Burger and Pande (2005) in India, as banks branches increases in the rural India poverty decreases. Degryse and Ongena (2005) argue that as the distance between the bank branches and the borrower/firms increases the loan rates increases worsening the lending conditions. These findings are similar only when poverty is measured by the Gini index. However, the relationship is insignificant in the long run. With improved access to finance poverty can be reduced in that the poor have the capacity to reduce their vulnerability to economic shocks (Dupas, Karlan, Robinson and Ubfal, 2018). The study found out that the bank branch penetration is cointergrated to poverty as measured by the poverty gap and the cointegration is only significant in the long run. In estimating the Gini index in this model the study dropped the period before 2008 as data prior to this had no variability.

In most developing countries the number of bank branches penetration is lower than in higher income countries (Dhrifi, 2015). Financial intermediation accompanied with financial access reduces inequality in the long run as more resources are accessible and are allocated to the poor (Dabla-Norries et al., 2015). There is no long run and short run relationship between access to finance and inequality in this study. This is in contrast with Mookerjee and Kalipioni (2010) findings of a negative and significant relationship between access to finance and inequality. The study fails to observe any short run effect between poverty proxies and financial intermediation and financial access. Greenwood and Jovanovic (1990) suggested that in the early stages of development finance increases poverty and later stages it reduces poverty as resource allocation will be accessible by the larger population. The Error correction terms for all the proxies of poverty are highly significant at 1 percent significance level. Any variability from equilibrium between the poverty proxies, financial intermediation and financial access is corrected at a speed of adjustment of 45.4 percent, 57.9 percent and 14.4 percent for poverty headcount ratio, poverty gap and Gini index respectively.

6.4.2.2.3 Cointegration and Error Correction Model for poverty proxies, financial intermediation and financial stability

This section discusses the results of our estimation on the cointegration between poverty proxies' financial intermediation and financial stability as measured by the bank Z-score. The 2007/9 Global financial crises provided a hint that financial instability can have detrimental effects to the welfare of the people specifically the poor who lacks investments to absorb periods of economic shocks. For a comparison of the reported results from the PMG estimator Appendix 24-26 presents the results in comparison with the MG and the DFE estimators. The results are summarised in Table 6.7 followed with the discussion of the long run and short run relationships between the financial intermediation, financial stability and the poverty proxies.

Table 6.7: Summary of the Pooled Mean Group on the cointegration of poverty proxies and financial intermediation and financial stability

	(1)	**(2)**	**(3)**
	∆hcr	**∆povgap**	**∆gini**
Long run			
pcredit	0.00131***	0.000406**	0.00134
	(3.18)	(2.76)	(0.65)
z	0.0103***	0.00412***	-0.00333
	(11.82)	(10.89)	(-0.73)
ECT	-0.258***	-0.433***	-0.272***
	(-4.17)	(-5.16)	(-6.21)
Short Run			
∆pcredit	-0.000321	-0.000353	0.00478
	(-0.16)	(-0.26)	(0.48)
∆z	-0.00140	-0.00218*	0.0119
	(-0.90)	(-1.86)	(1.18)
_cons	0.0501***	0.0312***	11.79***
	(2.99)	(3.49)	(6.23)
N	324	324	411

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. hcr (headcount ratio), povgap (poverty gap) and gini (gini index) as poverty proxies, pcredit is financial intermediation and z measures the bank z score measuring bank stability. ∆ is the difference operator.

Source: Author's computation

In the presence of financial intermediation, the financial stability has a positive long run relationship with the headcount ratio and the poverty gap. In this study the positive coefficients of Z-score suggest that an increase in the Z score (financial stability) in the long run increases poverty whilst it reduces inequality.

For the entire tests where poverty proxies were the dependent variables the error term which measures the speed of adjustment to the long run equilibrium after the short run divergence is negative and significant at 1 percent. Gujarati and Porter (2009) posited that the ECT must be negative and significant for the correction of the short run divergence to the convergence of its long run equilibrium. A positive error term will signify the divergence of the time series from its equilibrium and none of the error terms from this study was positive. The results from the study further satisfies the PMG condition of dynamic stability (long run relationship), negative and significant coefficients of the error which are not less than -2 (Loayza and Rancière, 2006). Cointegration and causal relationships between the poverty proxies and selected financial variables, namely financial intermediation, financial efficiency, financial access and financial stability as the dependent variables were performed. This analysis gives this study the advantage of examining some relationships that have not yet been extensively empirically researched. The study is able to examine how financial access, stability and efficiency have an impact on poverty reduction if they are added to the financial intermediation setting. In the presence of financial access, the long run relationship between financial intermediation and poverty proxies (headcount ratio and the Gini index) is positive and negative respectively. These long run relationships are different from the relationship between financial intermediation and these poverty proxies in the presence of financial efficiency (see Table 6.7).

In the presence of financial efficiency financial intermediation has a poverty reducing effect with the poverty headcount ratio whilst in the presence of financial access the poverty headcount increase with an increase in financial intermediation. Moreover, the same observation of the changes of the relationships was observed with inequality. In the presence of financial efficiency increase in financial intermediation increases inequality whilst in the presence of financial access financial intermediation reduces inequality. The financial dimensions can influence the other dimensions and its impact on poverty reduction. For example, access to finance is poverty reducing only when it accompanied with lower transaction costs (financial efficiency). If the financial services and products are accessible but too expensive the poor household and small business will not afford the financial services.

In the presence of financial stability, the relationship between financial intermediation has a positive long run relationship with all the poverty proxies although the inequality index is insignificant. The finding is consistent with Zhang and Naceur (2018) that in the presence of financial instability the effect of finance on increase poverty incidences as all the long run coefficients are positive. The financial dimensions have a link on each other as they can amplify or reduce the favourable effects on each other to poverty reduction. Policy makers should be mindful of other financial dimensions when instituting policies targeting poverty reduction using any of the financial dimensions. The study observed that the short run relationships between the joint effect of financial intermediation and the other financial dimensions were not significant except for the joint effect with financial stability on poverty gap. In a nutshell the study observed some changes in the coefficients of financial intermediation if another financial dimension is introduced to the model. The causal relationships of the financial variables and the poverty proxies are discussed in section 6.5.2.5

6.4.2.3 Panel Causality Test

The tri-variate ECM within the ARDL framework was utilised to examine the causal relationships between each of the poverty proxies and the selected financial variables namely (financial efficiency, financial access and financial stability) within the financial intermediation setting. The study did not perform the Granger causality test, rather the study used the ECM to examine the causality between the variable of interest in this study. The causality links that this study inferred are in three categories namely long run causality, short run causality and strong causality/joint causality and the results are summarised in Tables 6.10-6.15 for each of the poverty proxies. Literature references on the causal relationships between the financial dimension and poverty that we have analysed in this study is scant. For this study the causality between the variables is determined by the statistical significance of the coefficients while the statistical significance of the respective error terms shows joint causality of the variables for the panel.

Each of the variables selected for examining the causal relationship were taken in turns as a dependent variable in the tri-variate analysis of the relationships. In the previous section 6.4.2 including its subsections the study only discussed the

cointegration relationships results with poverty proxies as dependent variables. The study found cointegrating relationship between the selected independent variables and poverty hence the study proceeded and performed the error correction model to determine the short run relationships and infer causal relationship between the variables using the results.

The results for causal links of poverty as measured by the headcount ratio are reported in Table 6.10. Although this main interest in the causal links is between poverty and the financial variable of interest the study included the causal links between the financial variables themselves. The feedback loops within the financial sector can affect the performance of the other variables with relation to poverty. For example, increased access to finance enhances financial stability by increasing risk diversity through an increase in the funding base of bank deposits (Han and Melecky, 2013; Morgan and Pontines, 2014). Increased intermediation and access to these intermediated services reduces the risk of bank insolvency.

The results in table 6.8 are further elaborated in table 6.9 indicating a summary on the causal links between poverty as measured by the headcount ratio and the financial variables.

Table 6. 8: Panel-ECM

Dependent variable	Source of Causation (independent variables)						
	Long run coefficients			Short run coefficients			
	hcr	**pcredit**	**is**	**∆hcr**	**∆pcredit**	**∆is**	**ECT**
∆hcr		-0.0000591* (-2.51)	0.0108*** (125.30)		-0.00179 (-1.11)	-0.00523 (-1.14)	-0.437*** (-6.43)
∆pcredit	-34.93*** (-53.87)		2.940*** (21.72)	22.90 (0.71)		-0.0363 (-0.03)	-0.200*** (-3.10)
∆is	7.778*** (18.33)	0.180*** (17.39)		12.42 (1.32)	-0.0416 (-0.30)		-0.495*** (-4.98)
	hcr	**pcredit**	**cb**	**∆hcr**	**∆pcredit**	**∆cb**	**ECT**
∆hcr		0.000316*** (4.02)	-0.0536*** (-41.33)		-0.000706 (-0.41)	-0.0618 (-0.49)	-0.454*** (-5.12)
∆pcredit	-22.53*** (-10.41)		-2.003*** (-6.90)	18.38 (0.68)		27.56 (0.83)	-0.401*** (-5.06)
∆cb	-0.0760 (-0.67)	0.0419*** (20.20)		2.186 (0.66)	-0.00436 (-0.44)		-0.261*** (-4.20)
	∆hcr	**∆pcredit**	**∆z**	**∆hcr**	**∆pcredit**	**∆z**	**ECT**
∆hcr		0.00131*** (3.18)	0.0103*** (11.82)		-0.000321 (-0.16)	-0.00140 (-0.90)	-0.258*** (-4.17)
∆pcredit	19.47*** (3.44)		1.842*** (20.47)	-2.651 (-0.09)		-0.407 (-1.67)	-0.155** (-2.35)
∆z	0.905*** (7.70)	-0.00765*** (-11.38)		-1.244 (-0.81)	-0.00309 (-1.37)		-0.381*** (-4.35)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. hcr (headcount ratio), povgap (poverty gap) and gini (gini index) as poverty proxies, pcredit is financial intermediation and is measures financial efficiency, cb measures financial access z is the bank z score measuring bank stability. ∆ is the difference operator.

Source: Author's own computation

The causal links that are presented in Table 6.8 where the headcount ratio was used as the proxy for poverty are further elaborated and summarized in Table 6.9. The causal links are mainly in the long run and there is joint causality for the selected variables as the ECT coefficients are statistically significant. The causal analysis for the panel of the developing countries in this study is unique in that it did not only allow us to examine the relationship between poverty and financial variables, but also among the financial variable used in this study. Policy makers should not only be concerned with one dimension of financial intermediation of financial services to the poor and the small businesses. The efficiency and accessibility of the financial services is also important for the poor to have maximum benefits of financial intermediation (Beck 2007). Literature on the causal effect of the financial dimension (financial access, financial stability and financial efficiency) on poverty is very scant.

Previous studies who examine the causal effects of finance on poverty mainly used the trickle down approach where it was conditional on economic growth (see Jalilian and Kirkpatrick, 2002; Odhiambo, 2010; Jeanneney and Kpodar, 2011; Naceur et al., 2017). Furthermore, the analysis allows us to examine the causal analysis and the behavior of the variables within the financial intermediation setting by substituting financial efficiency, financial access and financial stability.Expanding financial intermediation and financial efficiency is on no value if the poor cannot access the financial services (Levine, 2008).

Table 6. 9: Panel ECM. Dependent variable- Headcount ratio

Dependent variable	**Source of Causation (independent variables**						
	Long run Causality			**Short run Causality**			
	hcr	**pcredit**	**is**	**∆hcr**	**∆pcredit**	**∆is**	**ECT**
∆hcr		Causality* (-2.51)	Causality*** (125.30)		No causality (-1.11)	No causality (-1.14)	Causality*** (-6.43)
∆pcredit	Causality*** (-53.87)		Causality*** (21.72)	No Causality (0.71)		No Causality (-0.03)	Causality*** (-3.10)
∆is	Causality*** (18.33)	Causality*** (17.39)		No Causality (1.32)	No Causality (-0.30)		Causality*** (-4.98)
	hcr	**pcredit**	**cb**	**∆hcr**	**∆pcredit**	**∆cb**	**ECT**
∆hcr		Causality*** (4.02)	Causality*** (-41.33)		No causality (-0.41)	No Causality (-0.49)	Causality*** (-5.12)
∆pcredit	Causality*** (-10.41)		Causality*** (-6.90)	No Causality (0.68)		No Causality (0.83)	Causality *** (-5.06)
∆cb	No Causality (-0.67)	Causality*** (20.20)		No Causality (0.66)	No Causality (-0.44)		Causality*** (-4.20)
	∆hcr	**∆pcredit**	**∆z**	**∆hcr**	**∆pcredit**	**∆z**	**ECT**
∆hcr		Causality*** (3.18)	Causality*** (11.82)		No Causality (-0.16)	No Causality (-0.90)	Causality*** (-4.17)
∆pcredit	Causality*** (3.44)		Causality*** (20.47)	No Causality (-0.09)		No Causality (-1.67)	Causality** (-2.35)
∆z	Causality*** (7.70)	Causality*** (-11.38)		No Causality 0.81)	No Causality (-1.37)		Causality*** (-4.35)

*, **, *** represent 10, 5 and 1 percent level of significance respectively, t statistics in parentheses, hcr (headcount ratio), pcredit is financial intermediation and is measures financial efficiency, cb measures financial access z is the bank z score measuring bank stability. ∆ is the difference operator

Source: Author's own computation

The study found bidirectional causality between poverty headcount ratio and financial intermediation in the long run. The causal links are in both directions where financial intermediation causes poverty and poverty causes financial intermediation. This finding contradicts that of Perez-Moreno (2011), who did not find any causality between private credit and poverty for a sample of developing countries. The Perez-Moreno (2011) study did not include the other financial dimensions in the regression analysis as for the period under study there no data was available for other financial dimension such financial access. Furthermore, the periods included 1970–1980 and 1980–1990 during which period financial reforms such as financial liberalisation could have an effect on the causality effects as the results were sensitive to the period of study. The study further tested the causal links jointly with other financial dimension and found that financial intermediation jointly causes poverty with financial efficiency, financial access and financial stability. The relationship between financial efficiency and the headcount ratio is bidirectional where the financial efficiency causes poverty and vice versa. Efficient provision of financial services reduces poverty which in turn increases the demand of financial services providing an explanation of the causal links between poverty and financial intermediation and financial efficiency (Beck et al. 2007).

The causal link between poverty and financial access is unidirectional in that financial access causes poverty headcount ratio in the long run but the study failed to observe the same links in the direction of poverty to financial access. Empirical studies available focused on the role of financial access in reducing poverty than the causal relationship between financial access and poverty (see Burgess and Pande, 2005; Mookerjee and Kalipioni, 2010; Naceur and Zhang, 2018). There is bidirectional long run relationship between financial stability (Z-Score) and the headcount ratio. As earlier noted that the study also allows for an inference of the causal links between the financial variable in the study, there is bidirectional relationship between financial efficiency and financial intermediation. In the long run financial efficiency causes financial intermediation and the vice versa in the long run. Beck (2007) argued that lower interest spread facilitates the increased access of credit. Hence improved bank efficiency causes financial intermediation as the credit extension increases as credit becomes cheaper and more accessible. Furthermore, there is bidirectional causal

links between financial access and financial intermediation as the results shows that financial intermediation causes financial access and vice versa.

The stability of the financial sector is crucial for the performance of the sector in the real economy. The study found bidirectional causal links between financial intermediation and financial stability. Financial intermediation causes financial stability and vice versa. Kaminsky and Reinhart (1999) opined the monetary aggregates such as domestic credit are the best predictors of financial fragility in any economy. Furthermore, unsustainable intermediation of financial services cause instability in the banking sector (Beck and Feyen, 2013). The study fails to observe causal links in the short run when the study used poverty headcount as the proxy for poverty except for financial access. The error correction term is significant for all the relationship at 1 percent significance level. Any short run deviation from the equilibrium is corrected at a speed of adjustments of 25.8 percent form financial stability to headcount ratio and 38.1 percent from headcount ratio to financial stability. From the results presented in the Table 6.11 there is no causal relationship between the poverty proxies and financial intermediation and financial efficiency in the short run as the short run coefficients are all insignificant.

Table 6.12 presents the results of the analysis on the causal links between poverty gap and the financial variables selected for this study. In Table 6.12 the study used the poverty gap as the dependent variable.

Table 6.10: Panel ECM. Dependent variable- Poverty Gap

Dependent variable	Sources of Causation (independent variables						
	Long run coefficients			Short run coefficients			
	povgap	**pcredit**	**is**	**∆povgap**	**∆pcredit**	**∆is**	**ECT**
∆povgap		-0.00163*** (-19.62)	0.00193*** (8.11)		-0.00152 (-1.18)	-0.00433 (-1.27)	-0.493*** (-4.64)
∆pcredit	-76.70*** (-16.01)		4.941*** (16.37)	170.6 (1.21)		1.269 (0.84)	-0.192** (-2.27)
∆is	14.37*** (15.76)	0.187*** (19.83)		53.99** (2.08)	-0.0101 (-0.08)		-0.481*** (-4.93)
	povgap	**pcredit**	**cb**	**∆povgap**	**∆pcredit**	**∆cb**	**ECT**
∆povgap		-0.00107*** (-6.54)	-0.00804*** (-4.67)		-0.000609 (-0.31)	-0.112 (-1.10)	-0.579*** (-5.57)
∆pcredit	-31.56*** (-8.45)		-0.109*** (-3.69)	-3.476 (-0.03)		21.12 (0.74)	-0.423*** (-5.43)
∆cb	-1.216*** (-9.30)	0.0000190 (0.03)		16.38 (0.95)	-0.0000474 (-0.00)		-0.202*** (-2.68)
	povgap	**pcredit**	**z**	**∆povgap**	**∆pcredit**	**∆z**	**ECT**
∆povgap		0.000406** (2.76)	0.00412*** (10.89)		-0.000353 (-0.26)	-0.00218* (-1.86)	-0.433*** (-5.16)
∆pcredit	36.66*** (3.90)		1.884*** (21.52)	94.01 (0.71)		-0.668*** (-2.78)	-0.225*** (-2.83)
∆z	15.56*** (6.01)	-0.0748*** (-3.75)		315.9 (1.27)	-0.0470 (-0.63)		-0.673*** (-5.84)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. hcr (headcount ratio), povgap (poverty gap) and gini (gini index) as poverty proxies, pcredit is financial intermediation and is measures financial efficiency, cb measures financial access z is the bank z score measuring bank stability. ∆ is the difference operator.

Source: Author's own computation

Table 6.11 summarises the causal links between the selected financial dimensions and poverty gap. The summary is of the results depicted in Table 6.10 and it further elaborates the relationship between the financial dimensions and poverty.

Table 6.11: Causal links among the variables with poverty gap as the poverty measure

Dependent variable	Sources of Causation (independent variables						
	Long run coefficients			Short run coefficients			
	povgap	**pcredit**	**is**	**∆povgap**	**∆pcredit**	**∆is**	**ECT**
∆povgap		Causality*** (-19.62)	Causality*** (8.11)		No Causality (-1.18)	No Causality (-1.27)	Causality*** (-4.64)
∆pcredit	Causality*** (-16.01)		Causality*** (16.37)	No Causality (1.21)		No Causality (0.84)	Causality** (-2.27)
∆is	Causality*** (15.76)	Causality*** (19.83)		Causality** (2.08)	No Causality (-0.08)		Causality*** (-4.93)
	povgap	**pcredit**	**cb**	**∆povgap**	**∆pcredit**	**∆cb**	**ECT**
∆povgap		Causality*** (-6.54)	Causality*** (-4.67)		No Causality (-0.31)	No Causality (-1.10)	Causality*** (-5.57)
∆pcredit	Causality*** (-8.45)		Causality*** (-3.69)	No Causality (-0.03)		No Causality (0.74)	Causality*** (-5.43)
∆cb	Causality*** (-9.30)	No Causality (0.03)		No Causality (0.95)	No Causality (-0.00)		Causality*** (-2.68)
	povgap	**pcredit**	**z**	**∆povgap**	**∆pcredit**	**∆z**	**ECT**
∆povgap		Causality** (2.76)	Causality*** (10.89)		No Causality (-0.26)	Causality* (-1.86)	Causality*** (-5.16)
∆pcredit	Causality*** (3.90)		Causality*** (21.52)	No Causality (0.71)		Causality*** (-2.78)	Causality*** (-2.83)
∆z	Causality*** (6.01)	Causality*** (-3.75)		No Causality (1.27)	No Causality (-0.63)		Causality*** (-5.84)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. hcr (headcount ratio), povgap (poverty gap) and gini (gini index) as poverty proxies, pcredit is financial intermediation and is measures financial efficiency, cb measures financial access z is the bank z score measuring bank stability. ∆ is the difference operator.

Source: Author's own computations

For the causal links with poverty gap as the measure of poverty all the financial variables the study mostly found long run and joint causal link than in the short run. The causal link between poverty gap and financial intermediation exist under all the links analysed in this study, the relationship of financial intermediation and poverty was estimated jointly with financial efficiency, financial access and financial stability respectively. In all the scenarios financial intermediation has bidirectional causality

with poverty. Furthermore, the results show that has a joint causality to poverty with financial efficiency, financial access and financial stability respectively.

The empirical finding on the causality between financial efficiency and poverty gap is bidirectional causality in the long run with unidirectional causality in the short run from poverty to financial efficiency. Together with financial intermediation they jointly cause poverty. The study observed bidirectional causality between poverty gap and financial access in the long run with no short run causal links. The causal links of financial efficiency and poverty gap in the long run is bidirectional whilst the short run has a unidirectional causality from financial stability to poverty. In our empirical analysis the study further examined the relationship between the financial dimensions. There is bidirectional causality between financial efficiency and financial intermediation with no short run causality. In the long run causality between financial intermediation and financial access is unidirectional from financial access to financial intermediation. The stability of the financial sector causes better financial intermediation and better financial efficiency which in turn reduce poverty (Uddin et al., 2014). In the short run there is no causality between financial access and financial intermediation. The study further found bidirectional causality between financial stability and financial intermediation in the long run. In the short run the causality is unidirectional from financial stability to financial intermediation. Unlike with the other variables in which neutrality was observed on the short run causal relationship between the independent variables and the selected poverty proxies, with the Z-score the study observed a causal relationship between bank stability and poverty gap in the short run. Bank stability (Z-score) has a short run causality to poverty gap at 10 percent significant level and causal effect is unidirectional as the poverty gap do not cause bank stability in the short run (as shown in Table 6.10 and 6.11).

Table 6.12 and 6.13 reports the results of the analysis using the Gini index as the dependent variable and the financial variable of interest that were selected for this study.

Table 6.12: Panel ECM. Dependent variable- Gini index

Dependent variable	**Source of Causation (independent variables**						
	Long run coefficients			**Short run coefficients**			
	gini	**pcredit**	**is**	**∆gini**	**∆pcredit**	**∆is**	**ECT**
∆gini		0.00733*** (2.75)	0.0198*** (8.03)		-0.000871 (-0.23)	0.000679 (0.02)	-0.208*** (-6.16)
∆pcredit	0.805 (1.15)		-0.477*** (-5.32)	1.514 (0.48)		0.328 (1.12)	-0.227*** (-4.47)
∆is	-0.206** (-2.27)	0.0977*** (9.06)		3.211** (2.23)	-0.131 (-1.49)		-0.443*** (-8.26)
	gini	**pcredit**	**cb**	**∆gini**	**∆pcredit**	**∆cb**	**ECT**
∆gini		-0.106*** (-15.92)	0.0910 (1.53)		0.0226 (0.86)	-0.208 (-0.27)	-0.144*** (-2.87)
∆pcredit	1.956* (1.82)		1.134* (1.93)	2.620 (0.93)		-1.516 (-0.15)	-0.175*** (-2.83)
∆cb	-0.0969*** (-11.96)	0.0279*** (19.84)		0.0492 (0.40)	0.000326 (0.07)		0.000326 (0.07)
	gini	**pcredit**	**Z**	**∆gini**	**∆pcredit**	**∆z**	**ECT**
∆gini		0.00134 (0.65)	-0.00333 (-0.73)		0.00478 (0.48)	0.0119 (1.18)	-0.272*** (-6.21)
∆pcredit	2.871*** (3.73)		1.523*** (9.86)	2.836 (0.64)		-0.211 (-1.66)	-0.198*** (-3.52)
∆Z	-0.340 (-1.80)	0.0751*** (5.48)		1.052 (0.71)	-0.0889* (-2.04)		-0.504*** (-8.10)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. gini (Gini index) as poverty proxies, pcredit is financial intermediation and is measures financial efficiency, cb measures financial access z is the bank Z-score measuring bank stability. ∆ is the difference operator.

Source: Author's own computation

Table 6.13 is a summary of the results presented in table 6.12. Gini index and inequality are used interchangeably in the discussion.

Table 6. 13: Causal links among the variables with Gini index as the poverty measure

Dependent variable	Source of Causation (independent variables						
	Long run coefficients			Short run coefficients			
	gini	**pcredit**	**is**	**∆gini**	**∆pcredit**	**∆is**	**ECT**
∆gini		Causality*** (2.75)	Causality*** (8.03)		No Causality (-0.23)	No Causality (0.02)	Causality*** (-6.16)
∆pcredit	No Causality (1.15)		Causality*** (-5.32)	No Causality (0.48)		No Causality (1.12)	Causality*** (-4.47)
∆is	Causality** (-2.27)	Casaulity*** (9.06)		Causality** (2.23)	No Causality (-1.49)		Causality*** (-8.26)
	gini	**pcredit**	**Cb**	**∆gini**	**∆pcredit**	**∆cb**	**ECT**
∆gini		Causality*** (-15.92)	No Causality (1.53)		No Causality (0.86)	No Causality (-0.27)	-0.144*** (-2.87)
∆pcredit	Causality* (1.82)		Causality* (1.93)	No Causality (0.93)		No Causality (-0.15)	Causality*** (-2.83)
∆cb	No Causality*** (-11.96)	Causality*** (19.84)		No Causality (0.40)	No causality (0.07)		No Causality (0.07)
	Gini	**pcredit**	**z**	**∆gini**	**∆pcredit**	**∆z**	**ECT**
∆gini		No Causality (0.65)	No Causality (-0.73)		No Causality (0.48)	No Causality (1.18)	Causality*** (-6.21)
∆pcredit	Causality*** (3.73)		Causality*** (9.86)	No Causality (0.64)		No Causality (-1.66)	Causality*** (-3.52)
∆z	No Causality (-1.80)	Causality*** (5.48)		No Causality (0.71)	Causality* (-2.04)		Causality*** (-8.10)

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. gini (Gini index) as poverty proxies, pcredit is financial intermediation and is measures financial efficiency, cb measures financial access z is the bank z score measuring bank stability. ∆ is the difference operator.

Source: Author's own computation

Tables 6.12 and Tables 6.13 summarises the causal links of Gini and the financial intermediation, financial efficiency, financial access and financial stability. Theories do not explicitly provide a framework on the causal relationship between financial dimensions and inequality, the relationships that are theoretically available provide for the association between the variables than the causal effects (see Demirgüç-Kunt and Levine). Finance can determine the gap between the rich and the poor, consequently finance shapes the persistence of the inequality across generations (Demirgüç-Kunt and Levine, 2009). There is unidirectional causality between financial intermediation and inequality (Gini index) in that financial intermediation causes inequality and inequality do not cause financial intermediation.

In the long run there is a bidirectional causal relationship between income inequality and financial efficiency whilst in the short run the causal relationship is unidirectional in that income inequality causes efficiency in the financial sector since only the coefficients of the Gini index are significant. Theoretically, financial intermediation and financial efficiency can reduce intergenerational persistence in relative income by expanding economic opportunities to the small business and the poor (Becker and Tomes 1979, 1986; Greenwood and Jovanovic 1990). Naceur and Zhang (2018) found that enhancing financial efficiency reduces inequality the study was short of examining the causal relationship between financial efficiency and inequality. The study mostly found causality in the long run and joint causality with only unidirectional short run between financial efficiency and Gini index. In the short run inequality causes financial efficiency but the reverse does not hold for our study in the short run.

In the presence of financial efficiency the study found a unidirectional relationship between Gini and financial intermediation in that financial intermediation causes poverty and poverty do not cause financial intermediation in the long run. Higher fixed costs associated with small transaction hinders the intermediation of financial services to the poor and small businesses and together with financial efficiency, financial intermediation can cause poverty (Claessens and Perotti, 2007). The study further analysed the relationship of poverty and financial intermediation including other financial dimensions. When financial efficiency was introduced in the model the study found that financial intermediation and efficiency jointly causes poverty. The study fails to observe short run causal links between financial intermediation and financial efficiency. But in the short run there were causal links with a short run unidirectional causality where financial efficiency causes poverty and but poverty do not cause financial efficiency. Furthermore, jointly with financial access, financial intermediation causes poverty. Inequality in accessing financial services hurts the poor more than the rich, political influence protects the established rents for a few individuals at the expense of the poor and small business causing inequality in income (Rajan and Zingales, 2003; Acemoglu and Robinson,2005). Empirical studies that looked at the causal relationship between access to finance and poverty are scant as previously there was none availability of data on the access dimensions

When the study included financial stability dimension to financial intermediation the study found out that there were no causal links between financial intermediation and the Gini index in the presence of financial stability. The study fails to observe the causal links both in the long and the short run between financial stability and inequality although the joint causal links as depicted by the error correction term was significant. In the long run the study found a bidirectional causal links between financial efficiency and Gini index. In the short run the causal links are unidirectional where inequality causes financial efficiency and financial efficiency do not cause inequality. There is no causal relationship between Gini and financial access both in the long run and short run. The study fail to find even the joint causal links between the variables as the error correction term was insignificant.

The financial stability does not have any causal links with the Gini index both in the long run and short run, there was joint causal links together with financial intermediation. Dabla-Norris et al., 2015 opines that for developed countries prolonged periods of persistent inequality can cause financial instability as the influence of the rich affects the economic decisions. This did not find any causal links between financial stability and inequality. Further analysis of the causal links between the financial dimensions themselves shows that there is bidirectional causality between financial efficiency and financial intermediation in the long run. In the short run financial intermediation and financial efficiency do not have any causal links. Empirical literature mainly looked at the association of the financial dimensions, there is dearth of empirical literature that examines the causal relationship between the financial dimensions and poverty in which this study is contributing to this literature. Financial access has a bidirectional causal links with the financial intermediation. Increased intermediation of financial products and services has causal links with the access of financial product in the long run. In the short run the study fail to observe any causal links between financial access and financial intermediation. In the long run financial stability and financial intermediation have a bidirectional causal links where financial intermediation causes financial stability and vice versa. In the short run the causal links are unidirectional where financial intermediation causes financial stability.

As with the other poverty proxies the coefficient of the ECT for all the estimations is significant meaning there in joint causality that exists for the variables in the panel. Short run causality was only observed unidirectional from Gini to financial efficiency. As explained earlier that the performance of the financial variables can have feedback mechanisms within the financial sector. In most developing economies interest rate spreads are higher reflecting the higher cost of financial intermediation which in turn is associated with high risk aversion among lenders, higher opportunity cost emanating from the higher reserve requirement ratio, lower bank completion and higher overhead cost. These are mostly some of the traits of formal finance in the developing economies and they have repercussion of the well-being of society.

6.5 Chapter Summary

Summatively, various econometric methodologies were applied to answer the objectives of the study. Preliminary tests such as descriptive statistics and correlation analysis were performed to examine the nature of the data. Before the study performed the econometric models the diagnostic tests such as the unit root test and the Hausman test were performed. The study used the GMM to determine the relationship between poverty proxies and the selected variables of interest. The study performed the Hausman test to determine whether we should estimate the model using the system GMM for a panel with random or fixed effects. The results from the Hausman suggested that the most appropriate the test is for a panel with fixed effects. The results showed that there is no common consensus on the relationship between the selected independent variables and poverty. The variables related differently to the poverty proxies signalling that how poverty is defined and measured is significant.

After determining the relationship between the variables the ARDL was used to examine the cointegrating relationships between the financial variables namely (financial intermediation, financial access, financial efficiency and financial stability) and poverty. Although the panel ARDL do not specify the requirement to perform unit root test the variables should not be of higher order integration more than the first order integration. Using the unit root test some of the variables were at level whilst some had first order integration.

In the ARDL the study needed to determine whether the PMG, MG, or DFE is the most appropriate estimator. Using the Hausman test the PMG was the most appropriate estimator for the cointegration and the causal analysis between the variables. As the variables were cointegrated the study further used the panel ECM to test the short run relationship between the variables in this study. From the analysis the study concludes that there was mostly long run relationship between financial variables and poverty. The study found that the short run relationships between the financial variables and poverty are mostly insignificant. The error correction term for all the variables under examination was negative and significant. This implies that after the short run shocks the variables converge to the long run equilibrium. Using the results from the ARDL test the study deduced the causal links between the variables using the significance of the long run, short run and the ECT coefficients. The variables mostly had the causal links in the long run. The significance of the coefficients indicates causal links between the variables. The study observed neutrality of the causal links in the short run except for Gini and financial stability and poverty gap financial efficiency which had a positive cointegration in the short run with the financial stability. In both causal links the relationship was unidirectional from Gini to financial efficiency and from financial stability to poverty gap.

CHAPTER 7

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

7. Introduction

This concluding chapter provides a summation of the study that includes suggestions for future research in the subject area. Section 7.2 summarises the objectives of the study in order to illuminate the observations, arguments and conclusions of the study that are summarised in this chapter. Section 7.3 discusses the summary results of the study whilst section 7.4 provides the contribution of the study to the research area and the discipline. The theoretical, social and policy implications of the results are discussed in section 7.5. The limitations of the study and the recommendations for further research are elaborated in section 7.6.

7.1 Summary on objectives of the study

The main aim of the study was to examine the nexus between financial intermediation and poverty using panel of selected developing countries. The study sought to achieve this by examining the relationship between the selected determinants of poverty for this study and poverty. Poverty is measured in absolute and relative terms; hence this study used different poverty proxies that capture both the absolute dimension and the relative dimension in examining these relationships. Furthermore, the study sought to determine the cointegration between poverty proxies and the determinants of poverty. After confirming the presence of cointegration, the study examined the short run relationships. The study further examined the causal relationship between poverty and financial intermediation.

7.2 Summary of results

The role of financial institutions and markets in the social and political facets of the economy has been increasing in terms of capital accumulation and distribution. Financial services are vital for any economy, enabling families and companies with

opportunities to invest, save and risk mitigation. In most developing countries bank finance is the major source of external financing compared to the capital markets (Gries, 2009, Samargandi et al., 2015). The study examined the deterministic, cointegration and causal relationships among poverty proxies and the selected variables of interest for 35 selected developing countries. Annual data from 2004 to 2016 was used for the study. The GMM method of analysis was applied. For the deterministic relationship between financial intermediation and poverty found out that how poverty is defined and measured had an effect on how it relates to the selected variables of interest as the significance of the variables and the relationship varies from each measure. Financial intermediation, that is the channelling of funds from surplus units to deficit units is a causal factor in explaining poverty reduction (Beck et al., 2007) and the reduction in inequality (Demirgüç-Kunt and Levine, 2009). In addition financial intermediation explains the causal effects in the expansion of the breadth of access to financial services (Beck et al., 2007).

Theory is ambiguous on the role of finance in poverty and inequality reduction (Demirgüç-Kunt and Levine, 2009). Theoretically credit constraints in imperfect financial markets are binding on the poor and small businesses (Stiglitz and Weiss, 1981; Galor and Zeira, 1993). The efficiency of the banking sector in overcoming these market frictions has a poverty reducing effect (Beck et al., 2004, 2007). Higher interest spread (bank inefficiency), for this study, increases poverty as measured by the headcount ratio of the poverty gap whilst a decrease in interest spread (better financial efficiency) reduces poverty in the long run. The finding confirms the theoretical constructs that transaction costs, contract enforcement and the lack of credit history can be detrimental to the poor and small businesses and the removal of these constraints benefits the poor (Beck et al., 2007). Furthermore, if the efficiency of the financial sector improves the quality of the financial products and services already enjoyed by the people who have purchased the services without broadening access to the financial services and products it tends to increase inequality (Greenwood and Jovanovic, 1990). This is affirmed by the results of this study which indicate that in the presence of financial efficiency, financial intermediation increases inequality. Empirically the finding of increase in financial intermediation with an increase in inequality is in line with the findings of De Haan and Sturm (2017). Although there are lack of theoretical arguments on the causal relationship between finance and poverty,

Demirgüç-Kunt and Levine (2009) argued that public policies on the financial sector can be shaped by income distribution and vice versa.

The cointegration analysis of the study found that there is long run equilibrium relationship between financial intermediation and poverty proxies. This long run results found out that in the long run financial intermediation and financial efficiency increases inequalities confirming the Galor and Zeira (1993) and Banerjee and Newman (1993) assertions that countries with initial market inequalities maintain inequalities across generations and the rich benefits more from financial intermediation through accumulation of capital and investments in entrepreneurial projects to earn more income. This is further supported by the other strand of theory that suggests financial influence in intergenerational persistence of poverty and inequality (Demirguc-Kunt and Levine, 2009 and Galor, 2011).

Levine (2005) argues that the removal of these credit inefficiencies reduces inequality as the access to the financial products allow for capital accumulation, borrowing for consumption smoothing and for entrepreneurs to start business which has a poverty reducing effects. The results from the study where financial access have a poverty reducing effect confirms the arguments by Shaw (1973) and Pagano (1993) where finance is poverty reducing when the financial resources are available to the poor and the small businesses. For the cointegration relationships together with financial intermediation, the study found that the financial access has a negative and significant relationship with poverty headcount and poverty gap. For all the financial variables the study found long run relationships than the short run supporting that poverty is persistent.

The results of the study reveal that financial intermediation has a poverty reducing effect when poverty is measured by the poverty gap and the Gini index. Improved financial intermediation compounded with bank efficiency contributes to poverty reduction by facilitating capital accumulation among the low income earners through making financial services efficiently available. Furthermore, as the intermediated financial services to the poor increases they are able to manage their risks as the availability of financial services increases their capacity for risk management. Access to affordable finance is crucial for closing the gaps between household inequalities

through the ability of the financial sector to channel financial resources from the deficit to the surplus units (Babajide, Adegboye and Omankhanlen, 2015; Demirguc-Kunt et al. 2017).

To examine the cointegration and the causal relationship between financial intermediation and poverty the study employed the panel ARDL method of analysis. Using the PMG/ARDL the result suggests that how poverty is measured is important as the poverty proxies related differently to the financial variables. The ARDL answers the second and the third objectives of the study on the cointegrating relationships between poverty and the financial variables of interest. The study finds out that most variables have a long run relationship with the poverty proxies than in the short run.

All the variables in the study had joint causality effect to the poverty proxies as all the results from the ECT are significant. The study found out that introducing the other financial dimensions (financial efficiency, financial access and financial stability) in other cases changes the magnitude and the relationship between financial intermediation and the poverty proxies. The study is able to demonstrate how financial access, stability and efficiency have an impact on poverty reduction if they are added to the financial intermediation setting. In the presence of financial access, the long run relationship between financial intermediation and poverty proxies (headcount ratio and the Gini index) is observed to be positive and negative respectively. These long run relationships are different from the relationship between financial intermediation and these poverty proxies in the presence of financial efficiency (see Table 6.5).

In the presence of financial efficiency, financial intermediation has a poverty reducing effect as the relationship with the headcount ratio in the long run is negative. When financial access is included to financial intermediation instead of financial efficiency the poverty headcount ratio increases with an increase in financial intermediation. Moreover the same observation of the changes of the relationships was observed with inequality. In the presence of financial efficiency, an increase in financial intermediation increases inequality whilst in the presence of financial access financial intermediation reduces inequality. The financial dimensions can influence the other dimensions and its impact on poverty reduction. For example access to finance is poverty reducing only when it is accompanied by lower transaction costs (financial

efficiency). If the financial services and products are accessible but too expensive the poor household and small business will not afford the financial services. In this study it was observed that there are feedback mechanisms among the financial variables themselves such that it affects the impact of each of the variables on poverty.

7.3 Contribution of the study and policy implications

The studies that have covered the role of finance in a panel of developing economies have mainly focused of the size of the financial sector than the other financial dimensions (Clarke et al. 2006; Nikoloski 2013; De Haan and Sturm, 2017). The study contributes to literature as an extension to the already existing knowledge. Over and above the commonly used proxies for financial intermediation and development, the study further includes remittances and the domestic public debt, which are not discussed extensively in financial intermediation settings. There are continuous improvements of data available for measuring financial access, the study uses new data and modern econometric procedures such as the panel ARDL that haven't been extensively used in previous studies on the relationship between financial intermediation and poverty.

The role of remittances in poverty reduction in a panel of African countries is not yet extensively covered, the study included remittances in the econometric model estimation. Since 2000, remittances have outpaced FDI and ODA and they have a role to play in developing countries because the poor access the remittance money directly. In the developing countries in our panel for the poverty proxies under analysis there were mixed results on the effect of remittance on poverty. With poverty measured by headcount ratio and per capita income remittances are pro poor although the relationship is insignificant. The effect of remittances on the poverty gap is positive and insignificant. The positive and significant relationship was observed between remittances and the Gini index. The results shows increase in remittances reduces inequality Furthermore the previous studies did not examine the other characteristics of finance than the size of the financial sector.

Studies that have been done so far mainly focused on financial development which in most cases does not necessarily mean efficient or increased financial intermediation. For example Beck et al., (2005) found that financial development in Nigeria in the 1980s was more of arbitrage and rent seeking it resulted in financial disintermediation. De Haan and Sturm (2017) recommended that the empirical studies should examine other characteristics of finance rather than only the size of the financial sector. This study contributes to this literature by including the other dimensions (financial efficiency, financial access and financial stability) of finance. Furthermore, by including remittances and domestic public debt in a financial intermediation setting the study sought to identify other channels to poverty reduction than the one that works through growth. The results of domestic public debt for this study were not significant with relation to the poverty proxies for our study. Irrespective of being insignificant for all the poverty proxies domestic debt had a negative relationship implying a pro poor effect of domestic debt. Public debt is only pro poor if that debt is used to finance productive investments.

The use of the principal component analysis in developing an index, which is a multidimensional weighted index in coming up with the institutional quality index is a departure from previous studies where the index was developed using the arithmetic average. The results of this study are in contrast to Cepparulo et al., (2017) who used an arithmetic average to come up with an institutional quality index. For the poverty proxies of headcount ratio and the poverty gap all had a significant negative relationship with the institutional quality which is in contrast to this study. In this study an increase in the institutional quality increases the poverty headcount ratio. Consequently although insignificant, the relationship between poverty gap and the institutional quality index is positive. The difference in findings may be due to the differences in methodology, in the sample or the period of study. Since poverty is multidimensional, the study used a number of poverty proxies in order to achieve some rigour and robustness of observation and analysis. The reduction of inequality due to improvements in institutional quality is in line with the finding of Claessens and Perotti (2007) and De Haan and Sturm (2017). Poverty is regarded as multidimensional hence using a number of proxies captured as much information as possible from each of the dimensions considered.

In examining the other financial characteristics the study included the analysis of relationship between financial intermediation and poverty within the context of financial efficiency, access and stability. To deduce the long run and short run equilibrium relationships between the financial dimensions and poverty the study used the financial dimensions of financial intermediation, financial efficiency, financial access and financial stability. Within the financial intermediation setting the long run relationship between the financial dimensions and poverty were all significant except for the Gini index and financial stability. Significant short run relationships were only observed with the dimension of financial intermediation in the presence of financial stability and poverty gap.

The observation of the significant long run relationships with few significant relationships in the long run as confirmed by the significance of the coefficients can confirm the persistent nature of poverty. In the theory of the culture of poverty is argued to be a cycle with intergenerational persistence. When financial efficiency was substituted with financial access the long run equilibrium relationship between financial intermediation and the headcount ratio and the Gini index was positive and negative a result that is contrary to the long run relationship between financial intermediation and poverty proxies in the presence of financial efficiency. This suggests that the feedback mechanism within the financial dimensions can affect the effect of each of the dimensions on poverty in the long run. Policy makers should bear in mind the long term impact of financial dimensions in instituting policies that addresses the poverty and inequality challenges. The effect of financial dimension on poverty in the long term has more ramifications to the economic and social landscapes.

Causality between financial intermediation including the other dimension of finance such as financial efficiency, financial access and financial stability and poverty is scantly studied for a panel of developing countries and therefore this study made a contribution in this regards. The causal relationships that were observed for this study were mainly in the long run than short run relationship. In the long run the study found bidirectional causality between financial intermediation and poverty proxies. Furthermore jointly with financial efficiency financial intermediation causes poverty and the results hold for all the poverty proxies. There were no causal effects between financial intermediation and poverty in the presence of financial efficiency. This causal

analysis between the financial dimensions using the pooled mean group estimation technique for a panel of developing countries is not covered by literature.

Zhang and Naceur (2018) confirmed correlation/association between financial efficiency and inequality but did not further test the causality between the financial efficiency and inequality. Most studies that empirically tested the causality between finance mainly focused on the financial development aspect and tested the causality with poverty conditional on economic growth (the trickle down hypothesis) than the direct causal effects between poverty and the financial dimensions (see Honohan, 2004), Odhiambo, 2010; Donou-Adonsou and Sylwester, 2016). The results from this study are different from Perez-Moreno (2011) who only tested the financial development aspect without analysing the financial access, financial stability and financial efficiency causal effects with poverty. Contrary to the finding of this study Perez-Moreno (2011) did not affirm causal links between the ratio of private credit to gross domestic product to poverty measured with the headcount ratio.

An analysis of the relationship between financial intermediation and poverty through an investigation of the deterministic, cointegration and causality relationships is on its own a contribution as to the best of our knowledge there is no study that did such an in-depth analysis using different methodologies. The causality analysis in this study further enabled us to analyse the causal links between the financial variables themselves.

Furthermore the analysis with the utilisation of the four poverty proxies is a contribution to literature in that how poverty is measured has an impact on how poverty relates to the determinants selected for this study. This allows us to check the sensitivity of the results to the way poverty is measured. On the deterministic relationships the results differ in the direction of influence either positive or negative. Additionally they differ on significance. For example the financial intermediation has a poverty reducing effect when poverty is measured poverty gap and Gini index whilst as measured with the headcount ratio and the gross domestic product per capita financial intermediation increases poverty incidences. The policy makers should carefully consider how poverty is measured whilst institute policy reactions to target poverty reduction. In the cointegration and the error correction analysis the study found that in the presence of

financial efficiency, financial intermediation increases poverty as measured by the Gini index for the panel of the developing countries in our study. On the contrary, in the presence of financial efficiency financial intermediation reduces poverty (headcount ratio and poverty gap) in the long run. In this regard policy makers might be inclined to reduce inequality which increased as a result financial intermediation and fail to find a balance in that in the same period that inequality increased poverty was reduced.

7.4 Theoretical, social and policy implications of the results

The effect of remittances in poverty reduction for this study was mixed and it was positively significant with inequality. An increase in remittances increases inequality by but with an insignificant reduction in poverty as measured by the headcount ratio. According to the World Bank (2019) remittances are proving to be a large economic driver in Africa since they have outpaced FDI and ODI, government should partner with the private sector in research and development on the business models that have an impact on reducing the cost of remittances. The SDGs acknowledged the cost of remittances in certain corridors to be very expensive for example SSA has the most expensive remittances corridors averaging 9.4 percent of the remitted money. In Saudi Arabia the central bank commissioned a pilot project with a private company (Ripple) that is aiding banks to improve their payment infrastructure on remittances by using block chain technology. This initiative has been said to be effective on how banks send money globally as it is fast and cost effective as compared to the traditional money transfer mechanism.

The Sustainable Development Goal (SDG) targets to reduce the cost of remittances to 3 percent so as to realise the full benefits of the impact of remittances on poverty reduction in the developing economies. The developing countries governments need to do more research on block chain solutions and partner with the banking sector to come up with cost effective alternatives for sending money as remittances are becoming a significant economic driver in reducing poverty in developing countries. Cost effective remittances means more money reaches the poor and it is directly used for consumption smoothing and investments in human capital reducing poverty

For this study we observed that the role of the financial sector on poverty depends on how poverty is measured. The study considered different poverty proxies to capture different aspects on poverty measurements. From the cointegration analysis, in the presence of financial efficiency, financial intermediation has a poverty reducing effect in the long run with rising inequality suggesting that increase in financial intermediation reduces poverty with an increase in equality in the long run. Therefore, there is need for policy makers to harmonise policy strategy in addressing poverty bearing in mind the different aspects of poverty measurements. The concept of poverty that is used is important for development policy to have coherent effect in the real sector (Ravallion, 2005). This can be addressed by increasing investment in human capital as education and skills are critical determinants of income in most developing countries. For example in absolute terms inequality and poverty cannot be the same but in relative terms these can be similar. This puts a caution on governments on the sole reliance on the secondary data in addressing inequality issues in their respective countries Furthermore redistributive policies in Africa should be improved. So far the governments' focus on reducing inequality is centred on redistributing land, progressing taxing and social expenditure policies.

The causes of poverty and solution for poverty, at large seem not to be well understood by the decision makers due to the complex nature of what constitutes poverty. For the analysis on this study we used multiple indicators of poverty than a single indicator, the results showed that different poverty proxies yield different results. Policy makers should take note of how poverty is measured in using financial dimensions to addressing the challenges of poverty. Distorted understanding and definition of poverty will result in distorted policies which yield little or no results for the effectiveness of the financial sector in poverty reduction. It is imperative for the policy makers to understand poverty specifics and how they define it for targeted and effective policy. Knight (1921) and Keynes 1936 argued that an uncertain future and lack of coordination have led to the imperfect knowledge in decision making by policy makers. The SDG of ending *poverty in all its forms* is the acceptance of development policy that poverty cannot be measured by a single indicator, policy based on one aspect of poverty can be a wild goose chase as policies that target one poverty dimension can have detrimental effects to the other dimensions of poverty.

For this study access as measured by the ATMs 1000/km^2 was positive and significant. An increase in access to finance increases the gross domestic product per capita for the panel of countries in our study. with the other poverty proxies the access as measure with ATMs 1000/km^2 the results were insignificant in the cointegration analysis access to finance in the presence of financial intermediation are have a significant poverty reducing effect in the long run with the headcount ratio and the poverty gap. If it is profitable and sustainable for the private sector to increase outreach of financial products and services and reduce poverty this should be a focus of the private sector or public-private sector partnerships. The developing countries governments should consider investing the funds being used in promoting financial access in other welfare programmes than investing in improving access to finance by the poor.

7.5 Limitations of the study and recommendations for future research

There were challenges of missing data on the reliable sources such as the World Bank and the IMF and this limited the number of the countries covered by this study.The World Bank database is widely used and regarded as reliable source of data for poverty measures however there is lack of comprehensive data that covers most developing countries. It is recommended to increase coordination between respective countries and the World Bank in data collection and providing up-to-date and adequate data on poverty measurements. Mo Ibrahim Foundation (2017) laments that the 'extreme poverty in data' on poverty, requires an urgent cooperation between the World Bank and the governments of developing economies in providing improved data frequency. Furthermore new data on the measures of financial access was not available before the year 2004 and thus the study could not be done for the period prior to 2004. This has limited the number of developing countries that could be covered by this study. The study relied on secondary data and if there is error of measurement from the data sources this affects the results of this study. However the study used publicly reliable sources of the World Bank and the IMF.

Behavioural finance has been a discipline not embraced in the provision of financial services but this has an impact on the uptake and use of financial service. The study did not account for the behavioural finance yet is it is an important aspect in the take up and use of financial services among the poor households and small firms. To date to the best of my knowledge there isn't any quantitative measurements on people's behaviour on financial decisions for a panel of countries. However, emerging banking institutions in some emerging markets such as the Discovery Bank in South Africa have introduced the banking services embracing the theory of behavioural finance in the provision of financial services (Discovery, 2018). The microeconomic decision of small businesses and households also have a significant impact on poverty reduction policies just as the macro decisions hence considerations on policies should also include these micro decisions which can be capture by behavioural finance. The success of the behavioural finance discipline in the context of developing economies is yet to be tried and tested empirically hence further research is needed on the behavioural finance whether it enhances intermediation, efficiency accessibility and stability of formal financial services by the poor and small businesses.

Furthermore, empirical studies are needed to examine whether digital finance is a substitute or it complements physical access to formal financial services in Africa. There are reports of some banks for example South Africa's major commercial banks (Absa, Standard Bank, Nedbank and First National Bank) which have opted to reduce the footprint of bank branches in favour of increasing the scope of digital finance (Citizen, 2019). In addition, the country is experiencing emergence of the banking institutions that have no physical branches and rely mainly on financial technology for the provision of financial services. The development of the quest to increase digital finance needs to be supported with empirical evidence whether it is beneficial to the larger population. In most developing countries, infrastructure that supports digital finance is weak in marginalised areas such as the rural areas. Furthermore, the credit infrastructure that is used by formal finance in credit extension decision making is weak or non-existent for the rural population and the low income earners. If the finance for all target is to be achieved, the mechanism that the finance reaches the low income households should be sustainable for both the individual and the service providers. In the African context the rural population is marginalised to technology infrastructure hence the inclusion of digital finance and accessibility of such services to this sector

of the economy with limited digital infrastructure needs to be empirically researched extensively.

The provision of financial services using digital technology is opined to be a cost-effective and commercially sustainable service provision for the low income households. On the contrary, to the best of my knowledge there are no empirical studies that focus on whether digital finance can be effectively used as a store of value by the poor. Sub-Saharan Africa is thought to be a trailblazer in the use of digital finance in emerging market (Suri and Jack, 2016). The mobile phone is ubiquitous in developing countries reaching above 80 percent of the population in some economies. Digital financial provision is cheaper than the brick and mortar of bank branches, but the compatibility of this innovation broadening access to finance need to be ascertained. Provision of formal finance in most economies is on a top-down approach where financial providers make assumptions of what people want. The services that are made available most often do not suit the profile of poor people and small businesses. Most of the digital financial services are being rolled out on a software application which requires one to have a smartphone to be able to use the application.

It is imperative therefore to have empirical studies to study how access to digital finance can be effectively taped so that they can be actively used by the poor households and small businesses for future transactions such as investment in human capital and venturing into new business projects. Non availability of enough quantitative data on mobile money for the time series dimension for the panel of countries for this study constrained the analysis of mobile money to be covered. A study on the impact of financial regulation on mobile money provider economics as part of the balance among multiple setting that comprises of the stability of the financial system, consumer interests, wider policy aims, and macroeconomic factors. In this study, arguments from the results suggest that nature of bank concentration can have an influence on the efficiency of the provision of the financial services. This suggests that market power of financial institutions can have a direct effect to poverty reduction. Most banking sectors in developing countries particularly in Africa are in an oligopolistic market structure, further studies are needed to determine whether the market structure of the banking system is a determinant of poverty. Few powerful financial players can have economic and political power to dictate policy; hence further

studies are needed to examine the role of bank concentrating on poverty in developing countries. Such further studies may stand to affirm and also expand the observations, arguments and some conclusions of the present study.

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Appendices

Notes

According the World Bank (2017) the poverty line is at the International Poverty Line has a value of US$1.90 PPP and this is the value that has been adopted for this study. The other poverty rates that have not been used for this study are the lower middle income class Poverty Line has a value of US$3.20 PPP and the World Bank stated that the upper middle income class Poverty Line has a value of US$5.50 PPP. World Bank together with the PovCalNet databases was used for data on the headcount ratio and the poverty gap and moving averages were used to fill in the missing data. As much as this is not the best alternative to the gaps in the data the decision was based on the fact that the policy guidelines for most developing countries on poverty are based on the data from the World Bank. Where there was more than one entry on the PovCalNet database the data from the most recent survey year was used and this was in line with the data that was available on the World Bank database.

In measuring the financial intermediation efficiency the lending deposit rate spread was used. In cases where the data on the lending deposit spread was not available the net interest margin was used. Thus net interest margin from the World Development Indicators of the World Bank was used for Ghana, Ethiopia, Morocco, Sudan and Tunisia, Cameroon, Democratic Republic of Congo and Congo Republic as the data interest rate spread for these countries was not available. Additionally the net interest rate was used in cases where only the either the deposit rate or the lending rate data was available this did not make it possible for the author to calculate the interest rate spread using these two data entries. Furthermore in case where the data had multiple missing gaps the net interest margin was also used in this case.

Appendix 1: Pairwise Correlation Matrix

	hcr	povgap	gini	gdpc	pcredit	atms	cb	is	inst1	inst2	inst3	instQ_index	inf	z	rem	dpd
hcr	1.0000															
povgap	0.9374*	1.0000														
gini	-0.0784	-0.0139	1.0000													
gdpc	-0.7632*	-0.6085*	0.4071*	1.0000												
pcredit	-0.5436*	-0.4665*	0.3402*	0.6092*	1.0000											
atms	-0.3753*	-0.3066*	0.0681	0.4155*	0.6391*	1.0000										
cb	-0.2794*	-0.2644*	0.0379	0.1593*	0.3492*	0.6494*	1.0000									
is	0.1400*	0.2458*	0.1264*	0.0735	-0.1382*	-0.0184	-0.0844	1.0000								
inst1	-0.3204*	-0.3769*	0.1281*	0.1837*	0.2655*	0.1126*	0.2742*	-0.1865*	1.0000							
inst2	0.0132	-0.0284	0.2501*	0.0483	0.0763	0.0969	0.3333*	0.1769*	0.0549	1.0000						
inst3	-0.5236*	-0.4768*	0.2519*	0.4936*	0.3995*	0.3593*	0.4471*	0.1291*	0.2872*	0.2497*	1.0000					
instQ_index	0.0132	-0.0284	0.2501*	0.0483	0.0763	0.0969	0.3334*	0.1769*	0.0549	1.0000*	0.2497*	1.0000				
inf	0.0957	0.1219*	-0.0154	-0.1294*	-0.2183*	-0.1399*	-0.0592	0.3535*	-0.0714	-0.0293	0.1077*	-0.0293	1.0000			
z	-0.5788*	-0.5076*	-0.1687*	0.3860*	0.4126*	0.3433*	0.4102*	-0.1243*	0.3419*	0.0125	0.3881*	0.0125	-0.1278*	1.0000		
rem	0.0155	-0.0477	-0.2560*	-0.2165*	-0.0540	-0.0325	0.1317*	-0.2042*	-0.0266	0.0977*	-0.2444*	0.0977*	-0.1324*	0.1115*	1.0000	
dpd	-0.4692*	-0.3850*	-0.0144	0.4411*	0.2531*	0.2856*	0.2679*	0.1430*	0.0758	0.2176*	0.2868*	0.2176*	-0.0137	0.2993*	0.0862	1.0000

The correlation coefficient between any pair of the variables is presented in this table. Poverty headcount(hcr), poverty gap (povgap), gini index and gross domestic product per capita are all the alternative proxies of poverty and are not used in the same equation for estimation. We estimated the correlation matrix at 5 percent significance.

Source: Authors own computations

Appendix 2: Dynamic panel-data estimations on the Determinants of poverty headcount ratio (hcr)

	(1) Pooled OLS	(2) FE	(3) RE	(4) LSDV_K	(5) SysGMM
L.hcr	0.975***	0.752***	0.962***	0.903***	0.872***
	(100.12)	(13.75)	(80.13)	(13.06)	(7.71)
pcredit	-0.00000265	-0.0000184	-0.0000529	0.000102	0.000206
	(-0.03)	(-0.08)	(-0.69)	(0.57)	(1.14)
atms	-0.0000245	-0.000307	0.0000883	0.0000338	0.000163
	(-0.11)	(-0.69)	(0.78)	(0.30)	(0.33)
is	0.000423**	0.000573**	0.000353*	0.000547	0.000584*
	(2.65)	(2.28)	(1.84)	(0.50)	(1.74)
instQ_index	0.000191	0.00784*	0.00150	0.00861	0.00918*
	(0.11)	(1.73)	(0.81)	(0.68)	(1.79)
inf	-0.000308	-0.000340	-0.000379	-0.000404***	-0.000177
	(-1.41)	(-1.25)	(-1.36)	(-17.77)	(-0.55)
z	0.0000397	-0.000625	-0.000200	-0.000928	-0.000541
	(0.19)	(-0.64)	(-0.68)	(-1.37)	(-0.50)
rem	-0.000477	-0.00228**	-0.000635	-0.00149***	-0.00164
	(-0.83)	(-2.55)	(-1.02)	(-6.28)	(-1.37)
dpd	-0.000306	-0.000125	-0.000323**	-0.000147	-0.000133
	(-1.95)	(-0.61)	(-2.06)	(-0.57)	(-0.46)
_cons	0.00383	0.0994***	0.0138		
	(0.62)	(4.05)	(1.82)		
N	283	283	283	283	248

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column represents a different regression technique. OLS is the ordinary least Squares, FE is Fixed Effects, RE is the random Effects, LSDV_K is the Least Square Dummy Variable corrected for the Kiviat bias and the SysGMM is System GMM

Source: Authors own computations using Stata

Appendix 3: Diagnostic statistics- Determinants of hcr as a measure of poverty

	Pooled OLS	FE	RE	LSDV	SysGMM
Observations	283	283	283	283	283
Groups	35	35	35	35	35
F Stats	3344.09	99.21			106.45
Prob>F	0.0000	0.0000			0.000
Hausman Test		47.82			
Prob>chi2		0.0000			
R-SQUARED					
Within		0.7331			
Between		0.9932			

Overall	0.9888	0.9844			
Rho		0.83769412			
Arellano-Bond AR(1)					-3.27
Prob>z					0.001
Arellano-Bond AR(2)					0.50
Prob>z					0.615
Sargan test of overid					3.76
Prob>chi2					0.288
Hansen test of overid					4.08
Prob>chi2					0.253
Instruments					12

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors own computations

Appendix 4: Dynamic panel-data estimations on the determinants of poverty gap (povgap)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
	Pooled OLS	**FE**	**RE**	**LSDV**	**SysGMM**
L.povgap	0.937***	0.600***	0.937***	0.801***	0.859***
	(34.60)	(6.06)	(61.50)	(8.65)	(8.31)
pcredit	0.0000100	0.000429	0.0000100	0.000268**	-0.0000875
	(0.12)	(0.81)	(0.20)	(2.55)	(-0.79)
atms	0.00000918	-0.000169	0.00000918	0.00000131	0.0000867
	(0.03)	(-0.96)	(0.12)	(0.03)	(1.02)
is	0.000721*	0.00133	0.000721***	0.00140	0.000917**
	(1.83)	(1.57)	(4.19)	(1.07)	(2.08)
instQ_index	0.000652	-0.000312	0.000652	0.00295	0.00153
	(0.39)	(-0.14)	(0.60)	(0.22)	(0.84)
inf	-0.000300*	-0.0000714	-0.000300*	-0.000201***	-0.000275
	(-1.84)	(-0.26)	(-1.78)	(-52.75)	(-1.47)
z	-0.0000975	-0.000102	-0.0000975	-0.000116	-0.000552
	(-0.54)	(-0.15)	(-0.56)	(-0.24)	(-1.14)
rem	-0.000206	-0.00154**	-0.000206	-0.000915**	0.000114
	(-0.61)	(-2.24)	(-0.51)	(-2.11)	(0.17)
dpd	-0.0000753	0.0000705	-0.0000753	0.0000526	-0.000184
	(-0.37)	(0.22)	(-0.52)	(0.19)	(-0.70)
_cons	0.00452	0.0375	0.00452		0.0218
	(0.92)	(1.51)	(1.03)		(1.02)
N	283	283	283	283	283

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column represents a different regression technique.

Source: Authors own computations

Appendix 5: Diagnostic statistics- Determinants of povgap as a measure of poverty

	Pooled OLS	FE	RE	LSDV	SysGMM
Observations	283	283	283	283	283
Groups	35	35	35	35	35
F Stats	887.39	45.37			890.42
Prob>F	0.0000	0.0000			0.000
Hausman Test		29.77			
Prob>chi2		0.0005			
R-SQUARED					
Within		0.3270			
Between		0.9446			
Overall	0.9498	0.9080			
Rho		0.77642239			
Arellano-Bond AR(1)					-2.08
Prob>z					0.037
Arellano-Bond AR(2)					0.57
Prob>z					0.567
Sargan test of overid					3.49
Prob>chi2					0.479
Hansen test of overid					5.46
Prob>chi2					0.244
Instruments					12

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors own computations

Appendix 6: Dynamic panel-data estimations on the determinants of inequality (gini)

	(1)	(2)	(3)	(4)	(5)
	Pooled OLS	FE	RE	LSDV	SysGMM
L.gini	1.003***	0.750***	1.000***	0.894***	1.026***
	(422.25)	(8.18)	(241.89)	(32.98)	(97.91)
pcredit	-0.0000757	-0.00794	0.000395	-0.00265**	-0.00256*
	(-0.12)	(-1.53)	(0.59)	(-2.02)	(-1.81)
atms	-0.00174	-0.00165	-0.00215**	-0.00299***	0.000634
	(-1.31)	(-0.61)	(-2.04)	(-3.59)	(0.31)
is	-0.00347***	0.00332	-0.00153	0.00441	-0.00303
	(-2.62)	(1.35)	(-0.66)	(0.67)	(-1.07)
instQ_index	0.000858	-0.0911	-0.00234	-0.0510	-0.0453*
	(0.04)	(-1.21)	(-0.10)	(-0.86)	(-1.87)
inf	0.00247	-0.000364	0.00144	-0.0000703	0.00206

	(0.92)	(-0.31)	(0.52)	(-0.02)	(0.93)
z	-0.000481	0.00646	-0.00101	0.00352	0.00591*
	(-0.37)	(1.04)	(-0.48)	(0.26)	(1.93)
rem	0.00575*	0.00167	0.00456	0.00254	0.0111*
	(1.84)	(0.28)	(0.99)	(0.11)	(1.86)
dpd	-0.000372	0.00304	-0.000467	0.00208	-0.000151
	(-0.27)	(0.98)	(-0.24)	(1.37)	(-0.13)
_cons	-0.146	11.09**	-0.0441		-1.207**
	(-1.42)	(2.71)	(-0.23)		(-2.59)
N	353	353	353	353	353

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column represents a different regression technique.

Source: Authors own computations

Appendix 7: Diagnostic statistics- Determinants of gini as a measure of poverty

	Pooled OLS	FE	RE	LSDV	SysGMM
Observations	353	353	353	353	353
Groups	35	35	35	35	35
F Stats	54179.82	48.35	124070.59		20543.84
Prob>F	0.0000	0.0000	0.0000		0.0000
Hausman Test		84.70			
Prob>chi2		0.0000			
R-SQUARED					
Within		0.7661	0.7532		
Between		0.9976	0.9997		
Overall	0.9981	0.9956	0.9981		
Rho		0.97849665			
Arellano-Bond AR(1)					-1.19
Prob>z					0.235
Arellano-Bond AR(2)					0.36
Prob>z					0.723
Sargan test of overid					1.65
Prob>chi2					0.799
Hansen test of overid					2.57
Prob>chi2					0.632
Instruments					14

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors own computations

Appendix 8: Dynamic panel-data estimations on the determinants of gross domestic product per capita (gdpc)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**

	Pooled OLS	FE	RE	LSDV_K	SysGMM
L.gdpc	1.011***	0.838***	1.008***	0.937***	1.003***
	(128.81)	(31.64)	(159.13)	(29.14)	(49.59)
pcredit	0.840	1.387	1.169	-1.331**	1.741
	(1.13)	(0.86)	(0.87)	(-2.52)	(1.19)
atms	4.857***	10.76***	3.292***	5.388**	4.563***
	(5.66)	(4.59)	(5.15)	(2.03)	(4.18)
is	-0.362	-1.981	0.613	-1.265	0.0574
	(-0.23)	(-0.81)	(0.35)	(-0.25)	(0.03)
instQ_index	-35.06***	-46.10*	-33.48	-37.08	-42.38*
	(-3.02)	(-2.01)	(-1.39)	(-1.02)	(-1.85)
inf	-0.0124	-2.003	-0.795	-2.228	0.454
	(-0.01)	(-0.95)	(-0.58)	(-1.11)	(0.31)
z	0.494	5.640	1.311	2.234	1.547
	(0.32)	(1.65)	(0.73)	(0.21)	(0.54)
rem	-2.429	-2.435	-2.773	-1.811	-0.476
	(-1.24)	(-1.16)	(-1.15)	(-0.12)	(-0.09)
dpd	-1.189	-1.635	-1.301	-3.004***	-0.270
	(-0.76)	(-0.97)	(-0.94)	(-2.64)	(-0.15)
_cons	43.79	805.6***	44.96		-3.000
	(1.75)	(5.01)	(1.53)		(-0.06)
N	353	353	353	353	353

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Each column represents a different regression technique.

Source: Authors own computations

Appendix 9: Diagnostic statistics- Determinants of gross domestic product per capita as a measure of poverty

	Pooled OLS	FE	RE	LSDV_K	SysGMM
Observations	353	353	353	353	353
Groups	35	35	35	35	35
F Stats	12518.17	407.18	180203.51		2063.46
Prob>F	0.0000	0.0000	0.0000		0.0000
Hausman Test		176.63			
Prob>chi2		0.0000			
R-SQUARED					
Within		0.9378			
Between		0.9991			
Overall	0.9976	0.9968			
Rho		0.93577574			
Arellano-Bond					-1.36
AR(1)					0.173
Prob>z					
Arellano-Bond					-1.36
AR(2)					0.173
Prob>z					
Sargan test of					72.77
overid					0.000
Prob>chi2					
Hansen test of					6.22
overid					0.183
Prob>chi2					
Instruments					14

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors own computations

Appendix 10: Summary of System GMM regression results dep vars: hcr, povgap, gini and gdpc using commercial banks an access measure

	(1) hcr	(2) povgap	(3) gini	(4) gdpc
L.dependent	0.835***	0.906***	1.023***	1.029***
variables	(6.43)	(8.44)	(105.76)	(34.21)
pcredit	0.000139	-0.0000366	-0.00208*	0.00910
	(0.51)	(-0.33)	(-1.77)	(0.01)
cb	-0.00108	0.0000303	0.00480*	8.585***
	(-0.73)	(0.21)	(1.94)	(3.15)
is	0.000488	0.000684	-0.00119	0.228

	(1.36)	(1.51)	(-0.42)	(0.13)
instQ_index	0.00898	0.000668	-0.0391	-27.92
	(1.28)	(0.35)	(-1.61)	(-1.58)
inf	-0.0000147	-0.000295	0.00265	0.635
	(-0.04)	(-1.58)	(1.21)	(0.59)
z	0.0000824	-0.000378	0.00406	-1.278
	(0.08)	(-0.67)	(1.30)	(-0.42)
rem	-0.00184	0.000155	0.0111*	2.444
	(-1.45)	(0.22)	(1.87)	(0.49)
dpd	-0.000164	-0.0000811	-0.000418	-1.730
	(-0.57)	(-0.25)	(-0.33)	(-0.86)
_cons		0.0133	-1.093**	-33.10
		(0.54)	(-2.48)	(-0.73)
N	279	314	397	398

Notes: **:** ***, **,* are statistical significance at the levels of significance of 1%, 5% and 10% levels respectively; t statistics in parentheses, p values reported for AR(2) and the Hansen Statistic. The Hansen statistic test for overidentifying restrictions, which is asymptotically distributed as chi2 under the null of instrument validity. hcr is the poverty headcount ratio, pcredit is the ratio of private credit to gross domestic product, cb is the commercial banks per 1000, is the interest rate spread, instQ_index in the institutional quality index, inf is inflation z is the bank z-score, rem is remittance inflows and the dpd is the domestic public debt. Each column represents a different poverty proxy using the System GMM estimation technique. The variation in the sample size is due to missing data.

Source: Authors own computations

Appendix 11: Diagnostic statistics- Determinants of hcr as a measure of poverty with commercial banks as a measure of financial access

	Pooled OLS	FE	RE	LSDV	SysGMM
Observations	314	314	314		279
Groups	35	35	35		35
F Stats	3891.61	405.41			204.49
Prob>F	0.0000	0.0000			0.0000
Hausman Test		41.01			
Prob>chi2		0.0000			
R-SQUARED					
Within		0.7348	0.7234		
Between		0.9922	0.9985		
Overall		0.9811	0.9877		
Rho		0.79499555			
Arellano-Bond AR(1)					-3.25
Prob>z					0.001
Arellano-Bond AR(2)					0.53
Prob>z					0.595
Sargan test of overid					4.60

Prob>chi2					0.203
Hansen test of overid					5.84
Prob>chi2					0.120
Instruments					12

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix 12: Diagnostic statistics- Determinants of povgap as a measure of poverty with commercial banks as a measure of financial access

	Pooled OLS	FE	RE	LSDV	SysGMM
Observations	314	314	314	314	314
Groups	35	35	35	35	35
F Stats	915.36	85.35			1880.30
Prob>F	0.0000	0.0000			0.0000
Hausman Test					
Prob>chi2		0.0000			
R-SQUARED					
Within		0.4849			
Between		0.9793			
Overall	0.9552	0.9408			
Rho		0.58143663			
Arellano-Bond AR(1)					-2.18
Prob>z					0.029
Arellano-Bond AR(2)					1.06
Prob>z					0.291
Sargan test of overid					3.92
Prob>chi2					0.416
Hansen test of overid					6.61
Prob>chi2					0.158
Instruments					14

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix 13 : Diagnostic statistics- Determinants of gini as a measure of poverty with commercial banks as a measure of financial access

	Pooled OLS	FE	RE	LSDV	SysGMM
Observations	397	397	397	397	397
Groups	35	35	35	35	35
F Stats	54111.08	85.95			19106.67
Prob>F	0.0000	0.0000			0.0000
Hausman Test		65.09			
Prob>chi2		0.0000			
R-SQUARED					
Within		0.8155			
Between		0.9992			
Overall	0.9980	0.9975			
Rho		0.96859174			
Arellano-Bond AR(1)					-1.21
Prob>z					0.228
Arellano-Bond AR(2)					0.92
Prob>z					0.360
Sargan test of overid					1.65
Prob>chi2					0.799
Hansen test of overid					3.39
Prob>chi2					0.494
Instruments					14

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix 14: Diagnostic statistics- Determinants of gdpc as a measure of poverty with commercial banks as a measure of financial access

	Pooled OLS	FE	RE	LSDV	SysGMM
Observations	398	398	398	398	398
Groups	35	35	35	35	35
F Stats	12245.09	989.94			5957.25
Prob>F	0.0000	0.0000			0.0000
Hausman Test		84.81			
Prob>chi2		0.0000			
R-SQUARED					
Within		0.9016			
Between		0.9989			
Overall	0.9979	0.9970			
Rho		0.16941244			
Arellano-Bond AR(1)					-1.37
Prob>z					0.171
Arellano-Bond AR(2)					0.53
Prob>z					0.164
Sargan test of overid					78.77
Prob>chi2					0.000
Hansen test of overid					5.96
Prob>chi2					0.202
Instruments					14

Note: t statistics in parenthesis. * *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix 15: Cointegration, error correction and causality between poverty (headcount ratio), financial intermediation and financial efficiency

	(1)	(2)	(3)
∆HCR	**PMG**	**MG**	**DFE**
Long run			
pcredit	-0.0000591*	-0.00491	-0.00111
	(-2.51)	(-0.74)	(-0.76)
is	0.0108***	-0.0462	0.00291
	(125.30)	(-1.29)	(1.32)
ECT	-0.437***	-0.570	-0.209***
	(-6.43)	(-1.54)	(-6.76)
Short run			
∆.pcredit	-0.00179	0.00309	-0.000365
	(-1.11)	(1.11)	(-0.65)
∆.is	-0.00523	-0.0654	-0.00105
	(-1.14)	(-1.48)	(-1.44)
_cons	0.107***	0.0493	0.0762***
	(3.70)	(0.17)	(4.43)
N	321	321	321
		Hausman test pvalue: 0.5315	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. HCR is poverty headcount ratio, pcredit is financial intermediation and is represents the interest rate spread measuring bank efficiency.

Appendix 16: Cointegration, error correction and causality between poverty (poverty gap), financial intermediation and financial efficiency

	(1)	(2)	(3)
∆.povgap	**PMG**	**MG**	**DFE**
Long run			
pcredit	-0.00163***	-0.0113	0.00152
	(-19.62)	(-1.52)	(1.09)
is	0.00193***	-0.0147*	0.00461**
	(8.11)	(-1.66)	(2.23)
ECT	-0.493***	0.0277	-0.231***
	(-4.64)	(0.03)	(-5.08)
Short run			
∆.pcredit	-0.00152	0.000615	-0.00130**
	(-1.18)	(0.37)	(-2.34)
∆.is	-0.00433	-0.0189*	0.000413
	(-1.27)	(-1.72)	(0.57)

_cons	0.0870***	0.0565	0.0155
	(4.23)	(0.52)	(1.24)
N	321	321	321
		Hausman test pvalue: 0.5079	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, poverty gap as a poverty measure), pcredit is financial intermediation and is measures the interest rate spread measuring bank efficiency.

Appendix 17: Cointegration, error correction and causality between poverty (gini index), financial intermediation and financial efficiency

	(1)	(2)	(3)
Δ.gini	**PMG**	**MG**	**DFE**
Long Run			
pcredit	0.00733***	-0.0145	-0.0340***
	(2.75)	(-0.58)	(-3.24)
is	0.0198***	0.851	0.0181
	(8.03)	(1.42)	(1.10)
ECT	-0.208***	-0.417***	-0.206***
	(-6.16)	(-8.13)	(-9.37)
Short run			
Δ.pcredit	-0.000871	-0.00391	0.000961
	(-0.23)	(-0.49)	(0.24)
Δ.is	0.000679	0.0444	0.00532
	(0.02)	(0.83)	(1.18)
_cons	9.223***	17.21***	9.109***
	(5.60)	(6.36)	(9.26)
N	411	411	411
		Hausman test p value: 0.6176	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. gini index (income inequality as a poverty measure), pcredit is financial intermediation and is measures the interest rate spread measuring bank efficiency.

Appendix 18: Cointegration, error correction and causality financial intermediation, poverty (headcount ratio and financial efficiency

	(1)	(2)	(3)
∆.pcredit	**PMG**	**MG**	**DFE**
ECT			
hcr	-34.93***	-1235.1	-28.43
	(-53.87)	(-1.52)	(-1.40)
is	2.940***	26.55	-0.180
	(21.72)	(1.44)	(-0.61)
ECT	-0.200***	-0.493**	-0.165***
	(-3.10)	(-2.10)	(-5.25)
Short run			
∆.hcr	22.90	54.71	-1.874
	(0.71)	(0.46)	(-0.32)
∆.is	-0.0363	-11.42	-0.106
	(-0.03)	(-0.90)	(-1.38)
_cons	7.635**	-55.15	7.310***
	(2.13)	(-0.51)	(4.03)
N	321	321	321
		Hausman test pvalue: 0.7297	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$headcount ratio as a poverty measure), pcredit is financial intermediation and is measures the interest rate spread measuring bank efficiency.

Appendix 19: Cointegration, error correction and causality between financial intermediation, poverty (gini index) and financial efficiency

	(1)	(2)	(3)
∆.pcredit	PMG	MG	DFE
Long run			
gini	0.805	79.94	-4.625***
	(1.15)	(1.06)	(-2.88)
is	-0.477***	21.92	-0.364
	(-5.32)	(0.75)	(-1.51)
ECT	-0.227***	-0.514***	-0.181***
	(-4.47)	(-7.12)	(-6.30)
∆.gini	1.514	2.638	-0.168
	(0.48)	(0.93)	(-0.28)
∆.is	0.328	1.553	-0.0310

	(1.12)	(1.29)	(-0.53)
_cons	0.959	66.66	43.05***
	(0.35)	(0.68)	(3.09)
N	411	411	411
		Hausman test pvalue: 0.7284	

Notes: t statistics in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01 Gini index as a poverty measure), pcredit is financial intermediation and is measures the interest rate spread measuring bank efficiency.

Appendix 20: Cointegration, error correction and causality between financial efficiency, poverty (headcount ratio) and financial intermediation

	(1)	(2)	(3)
∆.is	**PMG**	**MG**	**DFE**
Long run			
hcr	7.778***	25.16	-5.566
	(18.33)	(0.40)	(-0.43)
pcredit	0.180***	-1.051	0.111
	(17.39)	(-0.91)	(0.88)
ECT	-0.495***	-0.758***	-0.207***
	(-4.98)	(-4.52)	(-5.92)
Short run			
∆.hcr	12.42	20.50	-1.681
	(1.32)	(1.80)	(-0.37)
∆.pcredit	-0.0416	0.160	-0.102**
	(-0.30)	(0.89)	(-2.27)
_cons	0.548	8.659	1.535
	(0.73)	(1.21)	(1.06)
N	315	315	315
		Hausman test pvalue: 0.7050	

Notes: *t* statistics in parentheses * *p* < 0.10, ** *p* < 0.05, *** *p* < 0.01. hcr as a measure of poverty; pcredit is financial intermediation and is measures bank efficiency

Appendix 21: Cointegration, error correction and causality between financial intermediation, poverty (poverty gap) and financial efficiency

	(1)	(2)	(3)
Δ.pcredit	PMG	MG	DFE
Long run			
povgap	-76.70***	-3245.1	-42.08
	(-16.01)	(-0.84)	(-1.28)
is	4.941***	3.536	-0.825**
	(16.37)	(0.34)	(-1.97)
ECT	-0.192**	-1.277	-0.205***
	(-2.27)	(-1.72)	(-5.41)
Short run			
Δ.povgap	170.6	875.2	-0.670
	(1.21)	(1.12)	(-0.08)
Δ.is	1.269	-30.69	-0.0159
	(0.84)	(-1.43)	(-0.15)
_cons	7.674	-267.5	8.495***
	(1.64)	(-1.13)	(4.83)
N	250	250	250
		Hausman test pvalue: 0.9254	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Poverty gap as a measure of poverty; pcredit is financial intermediation and is measures bank efficiency

Appendix 22: Cointegration, error correction and causality between financial efficiency, (poverty gap) and financial intermediation

	(1)	(2)	(3)
Δ.is	**PMG**	**MG**	**DFE**
Longrun			
povgap	14.37***	971.0	24.51
	(15.76)	(1.06)	(1.42)
pcredit	0.187***	-1.409	0.118
	(19.83)	(-1.29)	(1.02)
ECT	-0.481***	-0.801***	-0.220***
	(-4.93)	(-5.23)	(-6.34)
Short run			
Δ.povgap	53.99**	54.67**	4.014
	(2.08)	(2.07)	(0.77)

Δ.pcredit	-0.0101	0.225	-0.0909**
	(-0.08)	(1.34)	(-2.03)
_cons	0.839	2.965	0.290
	(1.15)	(0.60)	(0.28)
N	315	315	315
		Hausman test pvalue: 0.4884	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Poverty gap as a measure of poverty; pcredit is financial intermediation and is measures financial efficiency.

Appendix 23: Cointegration, error correction and causality between financial efficiency, poverty (Gini index) and financial intermediation

	(1)	(2)	(3)
Δ.is	PMG	MG	DFE
Long run			
gini	-0.206**	-18.75	-0.519
	(-2.27)	(-1.06)	(-0.75)
pcredit	0.0977***	-0.425*	0.0509
	(9.06)	(-1.72)	(0.76)
ECT	-0.443***	-0.739***	-0.348***
	(-8.26)	(-13.68)	(-12.67)
Short run			
Δ.gini	3.211**	1.568	1.013**
	(2.23)	(0.89)	(2.23)
Δ.pcredit	-0.131	0.0300	-0.0712*
	(-1.49)	(0.40)	(-1.84)
_cons	5.392***	189.1	9.996
	(7.44)	(0.95)	(0.93)
N	399	399	399
		Hausman test p value: 0.1755	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. gini is the gini index as a measure of poverty; pcredit is financial intermediation and is measures the interest rate spread measuring bank efficiency.

Appendix 24: Cointegration, error correction and causality between poverty (headcount ratio), financial intermediation and financial stability

Hcr	(1) PMG	(2) MG	(3) DFE
Long run			
pcredit	0.00131***	0.00424	-0.00129
	(3.18)	(0.50)	(-0.92)
z	0.0103***	-0.0603	-0.00557
	(11.82)	(-1.05)	(-1.15)
ECT	-0.258***	-0.652***	-0.218***
	(-4.17)	(-2.35)	(-7.04)
Short Run			
∆.pcredit	-0.000321	-0.00512	-0.000210
	(-0.16)	(-1.37)	(-0.37)
∆.z	-0.00140	0.0214	0.00106
	(-0.90)	(0.97)	(1.12)
_cons	0.0501***	0.316***	0.100***
	(2.99)	(3.43)	(4.54)
N	324	324	324
		Hausman p value: 0.5908	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Hcr is the headcount ratio as a measure of poverty; pcredit is financial intermediation and z measures the bank z score measuring bank stability

Appendix 25: Cointegration, error correction and causality between poverty (povgap), financial intermediation and financial stability

∆.povgap	(1) PMG	(2) MG	(5) DFE
ECT			
pcredit	0.000406**	0.00279	0.00152
	(2.76)	(0.77)	(1.06)
z	0.00412***	-0.00702	-0.00148
	(10.89)	(-1.29)	(-0.32)
ECT	-0.433***	-0.556	-0.227***
	(-5.16)	(-1.30)	(-5.04)
Short run			
∆.pcredit	-0.000353	-0.00325	-0.00135**
	(-0.26)	(-1.28)	(-2.44)
∆.z	-0.00218*	0.00202	0.000347
	(-1.86)	(0.56)	(0.37)
_cons	0.0312***	0.107	0.0271
	(3.49)	(1.38)	(1.50)
N	324	324	324
		Hausman test pvalue: 0.4183	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Poverty gap as a measure of poverty; pcredit is financial intermediation and z measures the bank z score measuring bank stability

Appendix 26: Cointegration, error correction and causality between poverty (gini index), financial intermediation and financial stability

Gini	(1) PMG	(2) MG	(3) DFE
Long run			
pcredit	0.00134	-0.211	-0.0352**
	(0.65)	(-1.21)	(-3.24)
z	-0.00333	-0.393	0.0114
	(-0.73)	(-0.89)	(0.32)
ECT	-0.272***	-0.467***	-0.197***
	(-6.21)	(-5.57)	(-8.83)
Short run			
Δ.pcredit	0.00478	-0.00679	0.0000300
	(0.48)	(-0.50)	(0.01)
Δ.z	0.0119	0.0139	0.00356
	(1.18)	(1.18)	(0.48)
_cons	11.79***	20.74***	8.726***
	(6.23)	(5.72)	(8.77)
N	411	411	411
		Hausman test p value: 0.7068	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Gini as a measure of poverty; pcredit is financial intermediation and z measures the bank z score measuring bank stability

Appendix 27: Cointegration, error correction and causality between financial intermediation, poverty (hcr) and financial stability

Δ.pcredit	(1) PMG	(2) MG	(4) DFE
Long run			
hcr	19.47***	3589.0	-29.89
	(3.44)	(1.25)	(-1.55)
z	1.842***	0.653	-0.333
	(20.47)	(0.09)	(-0.52)
ECT	-0.155**	-0.786***	-0.171***
	(-2.35)	(-5.94)	(-5.47)
Short run			
Δ.hcr	-2.651	76.80	-0.162
	(-0.09)	(1.45)	(-0.03)
Δ.z	-0.407	-0.301	0.0468

	(-1.67)	(-0.70)	(0.48)
_cons	3.139	44.18**	8.067***
	(0.79)	(2.23)	(3.49)
N	324	324	324
		Hausman test pvalue: 0.3421	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Poverty gap as a measure of poverty; pcredit is financial intermediation and z measures the bank z score measuring bank stability

Appendix 28: Cointegration, error correction and causality financial stability, poverty (hcr) and financial intermediation

	(1)	(2)	(3)
Δ.z	PMG	MG	DFE
Long run			
hcr	0.905***	33.91	0.0869
	(7.70)	(1.05)	(0.72)
pcredit	-0.00765***	0.106	-0.00136
	(-11.38)	(0.45)	(-1.18)
ECT	-0.381***	-2.582	-0.706***
	(-4.35)	(-1.56)	(-12.68)
Short run			
Δ.hcr	-1.244	-20.33	-0.00608
	(-0.81)	(-0.99)	(-0.04)
Δ.pcredit	-0.00309	-0.00181	0.000447
	(-1.37)	(-0.23)	(0.31)
_cons	0.308***	0.0560	0.725***
	(3.07)	(0.04)	(9.52)
N	312	312	312
		Hausman test pvalue: 0.7543	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ hcr as a measure of poverty; pcredit is financial intermediation and z measures the bank z score measuring bank stability

Appendix 29: Cointegration, error correction and causality between financial intermediation poverty (povgap) and financial stability

Δ. pcredit	(1) PMG	(2) MG	(3) DFE
Long run			
povgap	36.66***	2799.9	-53.33
	(3.90)	(0.50)	(-1.55)
z	1.884***	-1.916	-0.432
	(21.52)	(-1.03)	(-0.70)
ECT	-0.225***	-1.169**	-0.193***
	(-2.83)	(-2.53)	(-5.38)
Δ.povgap	94.01	588.6	-1.742
	(0.71)	(1.19)	(-0.21)
Δ.z	-0.668***	0.195	0.0488
	(-2.78)	(0.43)	(0.46)
_cons	4.805	142.3	8.172***
	(0.95)	(1.27)	(3.75)
N	253	253	253
		Hausman test p value: 0.3332	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Poverty gap as a measure of poverty; pcredit is financial intermediation and z measures the bank z score measuring bank stability

Appendix 30: Cointegration, error correction and causality between financial stability, povgap and financial intermediation

Δ.z	(1) PMG	(2) MG	(3) DFE
Long run			
povgap	15.56***	1197.1	2.662
	(6.01)	(1.18)	(0.40)
pcredit	-0.0748***	-0.469	-0.0445
	(-3.75)	(-0.82)	(-1.21)
ECT	-0.673***	-0.717***	-0.640***
	(-5.84)	(-3.06)	(-10.38)
Short run			
Δ.povgap	315.9	527.8	-1.711
	(1.27)	(0.79)	(-0.33)
Δ.pcredit	-0.0470	0.293	0.0150
	(-0.63)	(1.43)	(0.37)

_cons	7.705***	49.62**	8.207***
	(4.22)	(2.53)	(6.37)
N	253	253	253
		Hausman test pvalue: 0.8575	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Poverty gap as a measure of poverty; pcredit is financial intermediation and z measures the bank z score measuring bank stability

Appendix 31: Cointegration, error correction and causality financial intermediation, poverty (gini index) and financial stability

	(1)	(2)	(3)
Δ.**pcredit**	**PMG**	**MG**	**DFE**
Log run			
gini	2.871***	4.878	-5.186***
	(3.73)	(0.75)	(-3.46)
z	1.523***	1.473	0.260
	(9.86)	(0.64)	(0.55)
ECT	-0.198***	-0.511***	-0.188***
	(-3.52)	(-7.05)	(-6.51)
Short run			
Δ.gini	2.836	4.431	-0.155
	(0.64)	(0.68)	(-0.26)
Δ.z	-0.211	0.0508	-0.0563
	(-1.66)	(0.29)	(-0.59)
_cons	-22.74***	-67.81	48.07***
	(-3.05)	(-0.73)	(3.49)
N	411	411	411
		Hausman test pvalue: 0.9760	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Gini as a measure of poverty; pcredit is financial intermediation and z measures the bank z score measuring bank stability

Appendix 32: Cointegration, error correction and causality financial stability, poverty (Gini index) and financial intermediation

	(1)	(2)	(3)
Δ.z	**PMG**	**MG**	**DFE**
Long run			
gini	-0.340	-0.902	0.341
	(-1.80)	(-0.51)	(0.93)
pcredit	0.0751***	0.356*	0.0399
	(5.48)	(1.87)	(1.12)
ECT	-0.504***	-0.851***	-0.446***
	(-8.10)	(-12.55)	(-10.87)
Short run			
Δ.gini	1.052	3.461*	0.110
	(0.71)	(1.76)	(0.35)
Δ.pcredit	-0.0889*	-0.136***	-0.0199
	(-2.04)	(-2.80)	(-0.74)
_cons	12.07***	45.69	-1.465
	(8.01)	(0.68)	(-0.20)
N	411	411	411
		Hausman test pvalue: 0.5622	

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Gini as a measure of poverty; pcredit is financial intermediation and z measures the bank z score measuring bank stability

Appendix 33: Cointegration, error correction and causality between poverty (hcr), financial intermediation and financial access

	(1)	**(2)**	**(3)**
hcr	**PMG**	**MG**	**DFE**
Long Run			
pcredit	0.000316***	-0.00104	-0.00178
	(4.02)	(-0.09)	(-1.20)
cb	-0.0536***	-0.372	-0.00344
	(-41.33)	(-1.48)	(-0.68)
ECT	-0.454***	-0.954***	-0.289***
	(-5.12)	(-7.91)	(-7.35)
Short run			
Δ.pcredit	-0.000706	0.00288	-0.000274
	(-0.41)	(1.03)	(-0.45)
Δ.cb	-0.0618	0.138	0.00176
	(-0.49)	(0.61)	(0.29)

_cons	0.210***	0.462***	0.116***
	(4.38)	(4.16)	(5.20)
N	271	271	271
		Hausman test pvalue 0.8751	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Headcount ratio as a measure of poverty; pcredit is financial intermediation and cb measures financial access as proxied by the number of commercial bank branches/ 1000km^2

Appendix 34: Cointegration, error correction and causality between poverty (povgap), financial intermediation and financial access

	(1)	(2)	(3)
∆.povgap	**PMG**	**MG**	**DFE**
Long run			
pcredit	-0.00107***	0.00355	0.000307
	(-6.54)	(0.46)	(0.22)
cb	-0.00804***	-0.244	-0.000944
	(-4.67)	(-1.27)	(-0.21)
ECT	-0.579***	0.137	-0.325***
	(-5.57)	(0.13)	(-4.86)
Short run			
∆.pcredit	-0.000609	-0.000432	-0.00142*
	(-0.31)	(-0.15)	(-2.24)
∆.cb	-0.112	-0.0764	0.00504
	(-1.10)	(-0.51)	(0.81)
_cons	0.111***	0.214**	0.0419*
	(4.95)	(2.90)	(2.37)
N	271	271	271
		Hausman test pvalue: 0.9232	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$povgap as a measure of poverty; pcredit is financial intermediation and cb measures financial access as proxied by the number of commercial bank branches/ 1000km^2

Appendix 35: Cointegration, error correction and causality between poverty (gini), financial intermediation and financial access

Δ.gini	(1) PMG	(2) MG	(3) DFE
Long Run			
pcredit	-0.106***	0.0589	-0.0254*
	(-15.92)	(1.26)	(-1.65)
cb	0.0910	-3.267*	0.0374
	(1.53)	(-1.71)	(0.57)
ECT	-0.144***	-0.482***	-0.204***
	(-2.87)	(-4.92)	(-8.03)
Δ.pcredit	0.0226	-0.0119	0.00231
	(0.86)	(-0.76)	(0.44)
Δ.cb	-0.208	0.853	0.0113
	(-0.27)	(1.22)	(0.16)
_cons	6.303**	21.66***	9.073***
	(2.79)	(4.97)	(7.87)
N	313	313	313
		Hausman test pvalue:0.2943	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Gini as a measure of poverty; pcredit is financial intermediation and cb measures financial access as proxied by the number of commercial bank branches/ 1000km^2

Appendix 36: Cointegration, error correction and causality between financial intermediation (dep variable), poverty (hcr) and financial access

Δ.pcredit	(1) **PMG**	(2) **MG**	(3) **DFE**
cb	-2.003***	114.4*	-0.630
	(-6.90)	(1.90)	(-1.22)
hcr	-22.53***	609.4	-36.33**
	(-10.41)	(1.62)	(-2.56)
ECT	-0.401***	-0.789***	-0.297***
	(-5.06)	(-6.97)	(-7.53)
Short run			
Δ.cb	27.56	-25.83	0.572
	(0.83)	(-1.17)	(0.96)
Δ.hcr	18.38	47.03	2.980

	(0.68)	(0.63)	(0.49)
_cons	18.85***	60.77**	13.21***
	(3.97)	(2.20)	(6.04)
N	271	271	271
		Hausman test pvalue: 0.8605	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Headcount ratio as a measure of poverty; pcredit is financial intermediation and cb measures financial access as proxied by the number of commercial banks/1000km^2

Appendix 37: Cointegration, error correction and causality between financial access (dep variable), poverty (HCR) and financial intermediation

	(1)	(2)	(3)
Δ. cb	PMG	MG	DFE
Long run			
hcr	-0.0760	-25.03**	64.16
	(-0.67)	(-2.03)	(0.19)
pcredit	0.0419***	-0.134	0.143
	(20.20)	(-0.72)	(0.10)
ECT	-0.261***	-0.665***	0.00389
	(-4.20)	(-4.73)	(0.23)
Short run			
Δ.hcr	2.186	6.935	0.349
	(0.66)	(1.47)	(0.50)
Δ.pcredit	-0.00436	-0.0386**	0.00560
	(-0.44)	(-2.30)	(0.81)
_cons	0.360	2.602	0.277
	(1.89)	(0.72)	(1.03)
N	271	271	271
		Hausman test pvalue: 0.7831	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Headcount ratio as a measure of poverty; pcredit is financial intermediation and cb measures financial access as proxied by the number of commercial banks/1000km^2

Appendix 38: Cointegration, error correction and causality between financial intermediation, poverty (povgap) and financial access

Δ.pcredit	(1) PMG	(2) MG	(3) DFE
Long run			
povgap	-31.56***	82.15	-55.66*
	(-8.45)	(0.13)	(-2.40)
cb	-0.109***	27.02	-0.380
	(-3.69)	(0.94)	(-0.74)
ECT	-0.423***	-0.773***	-0.285***
	(-5.43)	(-6.08)	(-7.26)
Short run			
Δ.povgap	-3.476	-95.71	3.791
	(-0.03)	(-0.29)	(0.49)
Δ.cb	21.12	-30.82	0.603
	(0.74)	(-1.58)	(1.02)
_cons	16.80***	32.49	10.92***
	(3.61)	(1.72)	(7.03)
N	271	271	271
		Hausman test pvalue:0.9651	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Povgap as a measure of poverty; pcredit is financial intermediation and cb measures financial access as proxied by the number of commercial banks/1000km^2

Appendix 39: Cointegration, error correction and causality between financial access, financial intermediation, poverty (povgap)

Δ.cb	(1) PMG	(2) MG	(3) DFE
ECT			
povgap	-1.216***	-99.43	-41.29
	(-9.30)	(-1.60)	(-0.29)
pcredit	0.0000190	-0.329	-0.0452
	(0.03)	(-1.01)	(-0.06)
SR			
ECT	-0.202***	-0.672***	0.00694
	(-2.68)	(-4.15)	(0.42)
Δ.pcredit	-0.0000474	-0.0283*	0.00619
	(-0.00)	(-1.76)	(0.88)
Δ.povgap	16.38	37.89	0.282
	(0.95)	(1.46)	(0.32)

_cons	0.712**	2.575	0.111
	(2.45)	(1.47)	(0.57)
N	271	271	271
		Hausman test pvalue: 0.5381	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Povgap as a measure of poverty; pcredit is financial intermediation and cb measures financial access as proxied by the number of commercial banks/1000km^2

Appendix 40: Cointegration, error correction and causality between financial intermediation, poverty (gini), and financial access

	(1)	(2)	(3)
Δ.pcredit	PMG	MG	DFE
Long run			
cb	1.134*	82.75	-0.777
	(1.93)	(1.59)	(-1.05)
gini	1.956*	-2.215	-2.908*
	(1.82)	(-0.38)	(-2.20)
ECT	-0.175***	-0.790***	-0.218***
	(-2.83)	(-8.58)	(-6.26)
Short run			
Δ.cb	-1.516	-32.43	1.523**
	(-0.15)	(-1.21)	(1.98)
Δ.gini	2.620	3.962	0.280
	(0.93)	(1.11)	(0.47)
_cons	-7.818*	43.33	34.88**
	(-1.82)	(0.22)	(2.49)
N	313	313	313
		Hausman test pvalue: 0.4186	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Gini as a measure of poverty; pcredit is financial intermediation and cb measures financial access as proxied by the number of commercial banks/1000km^2

Appendix 41: Cointegration, error correction and causality between financial access, financial intermediation and poverty (gini)

	(1)	(2)	(3)
Δ.cb	PMG	MG	DFE
Long run			
pcredit	0.0279***	-0.110	-0.0216
	(19.84)	(-0.78)	(-0.63)
gini	-0.0969***	-0.361	-0.186
	(-11.96)	(-0.50)	(-0.65)
ECT	-0.139***	-0.364***	0.0948***
	(-3.23)	(-2.71)	(8.15)
Short run			
Δ.pcredit	0.000326	-0.00233	0.00788
	(0.07)	(-0.18)	(1.59)
Δ.gini	0.0492	-0.0497	-0.000470
	(0.40)	(-0.23)	(-0.01)
_cons	0.701***	-12.06	-0.915
	(2.97)	(-0.54)	(-0.75)
N	313	313	313
		Hausman test pvalue: 0.9281	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Headcount ratio as a measure of poverty; pcredit is financial intermediation and cb measures financial access as proxied by the number of commercial banks/1000km^2

Appendix 42: Cointegration, error correction and causality financial intermediation, poverty (gini index) and financial stability

	(1)	(2)	(3)
Δ.**pcredit**	**PMG**	**MG**	**DFE**
Log run			
gini	2.871***	4.878	-5.186***
	(3.73)	(0.75)	(-3.46)
z	1.523***	1.473	0.260
	(9.86)	(0.64)	(0.55)
ECT	-0.198***	-0.511***	-0.188***
	(-3.52)	(-7.05)	(-6.51)
Short run			
Δ.gini	2.836	4.431	-0.155
	(0.64)	(0.68)	(-0.26)
Δ.z	-0.211	0.0508	-0.0563

	(-1.66)	(0.29)	(-0.59)
_cons	-22.74***	-67.81	48.07***
	(-3.05)	(-0.73)	(3.49)
N	411	411	411
		Hausman test pvalue: 0.9760	

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$Gini as a measure of poverty; pcredit is financial intermediation and z stability proxied by the z score

For all the tables presented in the appendices the source is the authors' own computations from the research results unless stated otherwise.

Appendix 43: Variable definition and data source

Variables	Definition / Measure	Source
Poverty headcount ratio	Poverty headcount ratio is the percentage of the population living below the national poverty lines. In this study we used the World Banks measure of the national poverty line at US$1,90 per day	World Bank, PovcalNet
Poverty gap	Poverty Gap Index, measures the average income shortfall of the poor individual from the poverty line ($1.90 a day).	World Bank, PovcalNet
Gini index / coefficient	Measures income inequality or income distribution in a country, where 0 resembles perfectly equal society, while, 100 percent mirrors a very unequal condition.	Standardized World Income Inequality Database (SWIID), (Solt, 2016).
Inflation	General increase in the price level measured by the consumer prices index (annual percent)	World Development Indicators (WDI)
GDP per capita	GDP per capita, PPP (constant 2011 international $)	World Bank, International Comparison Program Database.
Efficiency (Lending deposit spread)	The interest rate spread (higher value mean higher inefficiency)	World Bank, Global Financial Development Database (henceforth GFDD)
Financial access	degree to which individuals can and do use formal financial services ATMs per 1000km^2 and commercial banks per 1000km^2	International Financial Statistics
Financial stability	Z score was adopted as a measure of financial stability	Bankscope, World Bank
Remittances received	Remittance inflows to GDP (%)	World Bank
Institutional Quality	Index developed using PCA from law and order, democratic accountability and bureaucracy in governments	IRCG
Domestic public debt	Central government domestic debt as a percentage of gross domestic product	GFDD, World Bank

Appendix 44: List of Countries used for the study

Algeria, Angola, Botswana, Brazil, Burkina Faso, Cameroon, China, Democratic Republic of Congo, Congo Republic., Cote d'Ivoire, Egypt Arab Rep., Ethiopia, Ghana, Guinea, Guinea-Bissau, India , Kenya, Liberia, Madagascar, Malawi, Mali, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia

Appendix 45: Ethical Clearance Certificate

UNISA university of south africa

UNISA DEPARTMENT OF FINANCE, RISK MANAGEMENT AND BANKING ETHICS REVIEW COMMITTEE

Date: 16 NOVEMBER 2018

ERC Ref #2018/CEMS/FRMB/018
Name : Mrs M Magwedere
Student #: 50663399

Dear Mrs M Magwedere

Decision: Ethics Approval from 16 November 2018 to 31 October 2023

Researcher(s): Name Mrs M Magwedere

E-mail address **rumagwedere@gmail.com**, telephone 0787119436

Supervisor (s): Name Prof J Chisasa
E-mail address chisaj@unisa.ac.za, telephone 012 429 4613

Working title of research:

Financial intermediation and poverty nexus: evidence from selected developing countries

Qualification: PHD FINANCE

Thank you for the application for research ethics clearance by the Unisa DFRB Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period **16 November 2018 to 31 October 2023**

*The Negligible **risk application** was **reviewed** by the DFRB Ethics Review Committee on 16 November 2018 in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment*

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The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the DFRB Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No field work activities may continue after the expiry date 31 October 2023 Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number 2018/CEMS/FRMB/018 *should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature 16/11/2018

Chair of DFRB ERC : Prof K Tsaurai

E-mail: tsaurk@unisa.ac.za

Tel: (012) 429-2140

Signature

Executive Dean: Prof T Mogale

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Apendix 46: Confirmation of professional editing

Letter of Confirmation

To: Whom it May Concern

Date: 11 July 2019

I write to confirm that I have done language editing on the dissertation: ***FINANCIAL INTERMEDIATION AND POVERTY NEXUS: EVIDENCE FROM SELECTED DEVELOPING COUNTRIES***, that has been written by Margaret Rutendo Magwedere. If you require any further details please do not hesitate to contact me.

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.....
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